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Table of Contents

Table of Contents

Journal of Qualitative Research in Education

The Evaluation of Secondary Education Basic Mathematics Curriculum through Stake's Responsive Evaluation Model*

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Abstract: The major aim of this study is to evaluate the 11th grade Basic Mathematics (BM) Curriculum implemented at a Vocational and Technical Anatolian High School (Tourism and Hotel Management) through Stake's Responsive Evaluation Model, and to depict to what extent it responds to the needs and career plans of its students. In this study, qualitative case study design and criterion sampling methods were employed. The data were gathered via observation schedules, document analysis, and semi-structured interviews with 43 participants. Data were analysed via systematic content analysis, inductive coding, and thematising. The results showed that the implementation of the 11th grade BM Curriculum, to a large extent, did not respond to the needs of this specific school, and the students were not able to transfer their math skills to other courses. Though the students used their math skills in their daily lives to an extent, their utilisation of mathematics in their vocations was quite limited. Implications suggest that teachers in the school (micro-level) need interdisciplinary cooperation, setting school performance criteria relevant to vocational high schools at the district level (mezzo-level) and creating and implementing relevant curricula for vocational high schools at the state level (macro-level).

Keywords: Curriculum evaluation, Stake's responsive evaluation model, vocational and technical high school, basic mathematics curriculum

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Introduction

Education's general aim has been to prepare each new generation for productive working life in any systemised society (Coombs, 1985). Besides its general aim, vocational education aims to acquire qualifications related to a certain profession, art, or employment. Even though its training program also includes general education elements, it provides the necessary training to acquire appropriate skills and technical knowledge so that students can exercise a profession, art, or activity (Kotsikis, 2007). When considered, vocational education cannot be differentiated from the purpose of general education except for its curriculum content and implications. The main objective of vocational education is to provide the economy with skilled human power and thereby to help countries develop their economic growth (Bennell & Segerstrom, 1998; Bertocchi & Spagat, 2004; Gray, 1993; Hoeckel, 2008; 2010; Ismail & Hassan, 2013; Kreysing, 2001; Lewin, 1993; Meer, 2007; OECD, 2010; 2014; Olkun & Simsek, 1999; Oxtoby, 1993; Ozer, 2018; Psacharopoulos & Patrinos, 1993; Wheelahan & Moodie, 2016).

Yet, improving the fit between education and work has received much attention for a long time. Psacharopoulos (1991) raised questions to depict concerns about establishing a match between education and work; such as (1) how to provide a school curriculum that is relevant to the world of work; (2) how to improve graduate unemployment statistics; (3) how to prevent the one-way street from school to the university; and (4) how to provide the necessary skills needed by the economy. In this regard, Olkun and Simsek (1999) state that to understand whether a particular training is relevant to the world of work: (1) students' ability and interest, (2) curriculum relevance in terms of content, teaching materials, and teacher training, and (3) employment conditions are needed to be assessed.

Accordingly, this study focuses on implementing academic content in vocational education and investigates whether it matches students' interests, perceived content relevance, and employment conditions. It yields a reflection on the 11th grade Basic Mathematics (BM) Curriculum, which can be implemented at both vocational and mathematically non-weighed departments at general high schools. Thereby, the study is expected to provide a broad perspective regarding whether the BM Curriculum responds to the needs of the students in a particular vocational high school inclusive of a wide variety of stakeholders and audiences through Stake's Responsive Evaluation Model.

Vocational Education and Basic Mathematics Curriculum

Ernest (2000) brings together the aim of teaching mathematics under three dimensions in terms of useful or necessary mathematics for employment and the economy, social and personal mathematics for personal and social relevance and appreciation of mathematics as an element of culture. Accordingly, the necessary mathematics is divided into three subcategories for the benefit of employment and society from an economic perspective and sustaining mathematics and mathematical interests themselves.

First, Ernest (2000) indicates that functional numeracy involves deploying math and numeracy skills adequate for successful general employment and functioning in society. It is described as a basic and minimal requirement for all students at the end of schooling, excluding those few preventive disabilities. Secondly, practical and work-related knowledge involves solving practical problems related to industry and are work-centred by using mathematics. It is described as unnecessary for all students; however, provide the basic understanding and capabilities upon which further specialist knowledge and skills can be built. Third of all, advanced specialist knowledge involves understanding advanced mathematic knowledge in high schools or universities. This knowledge is not a necessary goal for all but is desired or needed by a minority of students. Yet, Ernest (2000) suggests that this option must be available in schools, and indeed more students should be encouraged to pursue it. However, he emphasises that it should not dominate or distort the school mathematics curriculum.

Those subcategories are enlightening and identify the aim of teaching mathematics. Compared to those subcategories, a similar case also emerges in the Secondary Mathematics Curriculum of Turkey. The Secondary Mathematics Curriculum (Ministry of Education [MoNE], 2017; Revised in 2018) offers two elective mathematics courses (main course and basic) following students' needs, preferences, interests, and career plans. Indeed, the BM Curriculum shares the main goals with the Main Mathematics Curriculum yet is selected by students who would like to trace an alternative career path other than mathematics weighed departments at higher education. Under such circumstances, students may select basic maths course in 11th grade and follow it in 12th grade.

In terms of context, while elective main mathematics courses are implemented at Anatolian High Schools, and the elective basic mathematics course is implemented at Vocational and Technical, Fine Arts and Sports, and Anatolian High Schools, of which students have not selected mathematically weighed departments (such as non-mathematics courses or languages). In line with the Secondary Mathematics Curriculum, the basic mathematics course can be taught two hours a week in 11th grades. The BM Curriculum aims (MoNE, 2017 Revised in 2018);

> To equip students with the skills required to utilise those skills in their daily and occupational lives effectively. The BM Curriculum intends to foster students' problem solving, reasoning, and decision-making skills and help them use mathematics to make decisions. Concerning this, in 9th and 10th-grade mathematics curricula, some concepts and relations are taken into account via real-life problems. Thus, students selecting non-mathematics weighted departments in the next grade are foreseen to deal with real-life problems more effectively. Therefore, as is stated in the blueprint, the goal of the BM Curriculum is to develop students' problem-solving skills.

To reach those desired aims, the points to be considered are as follow MoNE, 2017 Revised in 2018):

1. Students are to be introduced to real-life problems and be taught how to deal with them,

2. The problems designed are to include situations in which students would utilise their reasoning and decision-making skills,

3. Problems are to be related to students' cultural environments and should include situations related to their families and immediate surroundings,

4. In lessons, real-life situations and problems should be the starting point, and students should feel the need to learn some topics and concepts. In this frame, the concepts of interest should be dealt with in the processes of problem-solving.

The students should collect, organise, analyse data, and present their results to achieve the curriculum aims via the Project-Based Learning Strategy (PjBL). In light of those aims, vocational and technical high school students may improve their core cognitive skills in mathematics, such as problem-solving, reasoning, and critical thinking. As is presumed in the curriculum, when students are equipped with those skills, they can succeed in their occupations and function efficiently in society.

Regarding this fact, the implementation and outputs of the BM Curriculum become another concern of this evaluation study.

Program Evaluation and Stake's Responsive Evaluation

Gredler (1996) defines program evaluation as "the activities of collecting information about the operations and effects of policies, curricula, courses, and other educational materials", and as a systematic inquiry design, it provides information for decision-makers or groups interested in a particular program, policy, or other intervention. Ornstein and Hunkins, on the other hand, describe evaluation as a three-step process; "delineating the information necessary for collection, obtaining the information, and providing the information to interested parties" (1998, p. 330). Gredler (1996) emphasises the importance of the evaluation process by suggesting it to be conducted at any of several phases of the program development and implementation. Moreover, he classifies the evaluation approaches as utilitarian and pluralist approaches represented by different evaluation models (Gredler, 1996). The utilitarian perspective expands the types of decisions and data sources appropriate for evaluation, particularly for decision-makers. In contrast, the pluralist perspective addresses various group interests in a program and/or sought to identify the underlying dynamics of program operation (Gredler, 1996).

As a pluralist one, in a responsive approach to evaluation (Abma & Stake, 2001; Greene & Abma, 2001; Guba & Lincoln, 1989; Stake, 1975), evaluation is not exclusively focused on the assessment of policy interventions and programs based on their effectiveness; moreover, it focuses on engaging all related stakeholders according to their practice. It mostly focuses on stakeholder issues and engages stakeholders in dialogues about the quality of their practice (Abma et al., 2001). The aim is to heighten the personal and mutual understanding of stakeholders, which would serve as a vehicle for practice improvement (Abma, 2006; Abma et al., 2001). This program evaluation model responds to audience requirements for information and refers to different value perspectives in reporting the merits and shortcomings of the program under interest (Abma, 2006; Stake, 1975). There are three responsive evaluation activities: the initial planning and focusing of the evaluation, conducting observations, and organising and reporting. These activities are not divided into phases because observation and feedback (reporting) are important activities for reaching a holistic perspective during the evaluation studies (Stake, 1975).

In Stake's Responsive Evaluation Model, the evaluator's primary task is to become acquainted with the program by observing program activities, examining relevant program documents, and interviewing stakeholders, to better understand the meaning of the stakeholder's interaction with the program (Abma, 2006; Stake, 1975; Stake, 1990). The evaluator then selects a few issues around which to organise the study and checks their ideas with individuals representing different audiences. Once the initial issues are identified, the evaluator selects appropriate methods for data collection. These decisions can be made by discussing several alternatives and negotiating with program staff and the evaluation sponsors (Stake, 1990).

On the other hand, a common misunderstanding of responsive evaluation identified by Stake (1990) is the erroneous belief that it is synonymous solely with qualitative inquiries. Instead, the evaluation may be conducted by following either a qualitative or quantitative approach in research. It is important to state that the selected methods must serve the information needs of the various audiences (Stake, 1990). Stake (1990) depicts that one concern in responsive evaluation is the use of participant testimony as a major data source. Therefore, Stake (1990) emphasises the importance of establishing the reliability of the data. In this manner, the evaluator should obtain the reactions of program personnel, exhibit their portrayals, check the relevance of evaluation findings, and share the results with the stakeholders. Stake (1973) remarks that much of this effort is mostly informal and may be ongoing during the evaluation, so that organising and reporting information in the responsive evaluation may occur at various times and in various ways. Different reports may be prepared for different groups according to emergent needs and the circumstances in the evaluation context (Stake, 1990). It is suggested for the evaluator to use portrayals often to provide a vicarious experience of the program. Some portrayals of a program may be short, such as a five-minute script, a log, or a scrapbook. Longer portrayals, however, may consist of narratives, photographs, maps and graphs, exhibits, and taped conversations (Stake, 1975). In this respect, Stake's Responsive Evaluation Model can help provide various information derived from various issues and conversations with different stakeholders to increase the personal and mutual understanding of stakeholders in practice improvement.

The Purpose of the Study

In the light of the framework that discussed Stake's Responsive Evaluation Model, the major concern of this study is to create an understanding and a dialogue among stakeholders in mathematics regarding the needs and career plans of vocational and technical high school students (as a concept of Tourism and Hotel Management High School). Depending on the articulations of teachers as a result of informal conversations in this specific context, there was a probable mismatch between the expectations of the BM Curriculum and the teachers' statements related to student skills needed for the sector of tourism. Additionally, student performance dissatisfaction in mathematics courses, based on teachers' articulations and the negative feedback provided by supervisors observing students during their internships, constituted the starting point of this study. Those problems, which seemed to be discussed among stakeholders, paved the way to question whether the curriculum was responsive to the needs of this specific vocational and technical Anatolian high school as a matter of research. As a result, the focus of the study shaped around reflecting upon the BM Curriculum in this specific context to find out whether it was preparing students for their prospective vocation. Accordingly, the purpose of this study is to evaluate the 11^{th} grade BM Curriculum to reveal whether and how this curriculum responds to the needs of this vocational and technical Anatolian high school through a responsive evaluation model. This study will be used as a set of recommendations to improve the mathematics curriculum implementation in such schools. The following research questions were answered to achieve the purpose of the study. The research questions specified below were determined to be in line with the characteristics of Stake's Responsive Evaluation Model.

1. Does the implementation of the 11^{th} grade BM Curriculum respond to the context of a Tourism and Hotel Management Anatolian High School?

2. What are teachers' opinions about the transference of the competencies attained via the 11^{th} grade BM Curriculum into the vocational and cultural courses (chemistry, biology)?

3. What are graduates' opinions about the effectiveness of the 11^{th} grade BM Curriculum concerning the transference of the math skills attained into their daily and vocational lives?

4. What are supervisors' opinions about the effectiveness of the 11^{th} grade BM Curriculum concerning the transference of math skills into students' vocational lives?

5. What are parents' opinions about the effectiveness of the 11^{th} grade BM Curriculum concerning the contribution of math skills into students' daily lives?

Method

Research Design

This study was carried out through a case study design. Yin (1984, p. 23) defines the case study research method as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". In this respect, the case study design was selected as it was in great harmony with the nature of the study. Thus, the researcher will collect data from various participants and dig into different perspectives in the real-life context of the BM Curriculum at a vocational and technical Anatolian high school.

Bogdan and Biklen (2007, p. 59) offered the metaphor of a funnel to describe best how a case study design should be represented. "The start of the study is the wide end. In time they [researchers] make specific decisions on what aspects of the setting, subject, or data source they will study. Their work develops a focus". This feature was best represented when researchers scouted for possible locations and people to decide upon their feasibility. Following the preliminary site visits and identifying the location to be searched for, the Gantt chart was scheduled to show the time distributed to whom per se to interview and what to explore. This short preliminary plan was held flexible as it was a stark contrast to the nature of qualitative research to set strict boundaries. To give shape and decide upon what to explore and/or who to interview, one of the researchers' weekly visits to the school and classrooms played a major role in true consistency with the design characteristics. These visits and observations were to shape and modify the research, and more was learned about the topic each time. Thereby, the focus of the study was developed, and the research questions were reformulated and modified. This study, which had begun with a broad exploratory initiative, was executed by more explicit data collection and analysis procedures compatible with the case study design and Stake's Responsive Evaluation Model.

Participants

The sampling method emerged from the regular school visits and the context in which the curriculum was being implemented. As Patton (2002) stated, the nature of qualitative research is well intertwined with purposeful sampling. Additionally, as underlined by Patton (2002, p. 230), "the power of purposeful sampling lies in selecting information-rich-cases for study in-depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry". That is, accessing the rich-informant cases "yields in-depth understanding and insights", which is not possible through empirical generalisations (Patton, 2002, p. 230). In order to access the informants who would give the richest and most quality data, Stake's Responsive Evaluation Model was selected as it was appropriate for achieving the purpose of this study. Among purposeful sampling methods in qualitative research, the criterion sampling method was selected. Various participants gave voice to as many different stakeholders and participants as possible with the criterion sampling method. It prevented the loss of quality data regarding the implementation of the curriculum. Besides, the chosen sampling method is also relevant to the case study design, which aims to understand the phenomena from different real-life contexts. In this context, criteria were determined to avoid losing quality data regarding reaching different perspectives. To create an understanding from different perspectives and to enlighten the research questions, the data were collected from various participants: students, mathematics teachers, administrators, parents, vocational course teachers, supervisors, and graduates by mainly using the criterion sampling method as is described below.

In this respect, the criteria for the students were determined as “highly interested and successful in mathematics courses”, “moderately interested and successful in mathematics courses”, and “low-interest and success in mathematics courses”. The purpose was to give voice to various perspectives and dig into reality. The rationale behind identifying these criteria was to minimise the probabilities of collecting data from similarly characterised participants. Moreover, to ensure variety, the sample of each focus group consisted of students from Foods and Beverages (F&B) and Accommodation and Travel (A&T) departments. This way, it was assured that the reality was represented through a wide range of perspectives and that accessing rich-informant cases in case study designs was confirmed.

Another group of participants includes mathematics teachers. The criterion identified to select mathematics teachers was determined as “teaching this course in this specific school at the academic year this study was conducted”. As parents are one group of the stakeholders who would have the chance to observe students’ math skills’ contribution to daily lives and assure variation of the data collected, they were also included in this evaluation study. The criteria identified and employed for sampling the students served as a basis for sampling the parents. Accordingly, two parents were selected from “highly interested and successful in mathematics courses”, two parents from “moderately interested and successful in mathematics courses”, and one parent from the “low-interest and success in mathematics courses”, which resulted in five parent participants in total. Regarding the sampling of administrators, the criterion was identified as “being in the administration board at this specific school”. According to this criterion, the participants consisted of one principal and one assistant manager.

Before embarking upon the sampling of cultural and vocational course teachers, better to clarify that in Turkey, at vocational high schools, courses are categorised as cultural and vocational courses. Cultural courses such as mathematics, biology, chemistry, Turkish language and literature, history, and so forth enhance students’ personal development and social skills. As the related research question was based on the transference of math skills into other mathematically weighted courses, the criterion of determining cultural course teachers was identified as “teaching biology, chemistry, or physics at this specific school”. About the vocational course teachers, as there were two major departments, Food and Beverages (F&B) and Accommodation and Travelling (A&T), assigned at the school, the criterion was identified as “being a teacher in F&B and A&T departments”. Here, sampling vocational course teachers gave voice to varied audiences affected by this curriculum and shed light on how math skills were transferred into students’ vocational courses and vocational skills. For this purpose, three F&B and; two A&T teachers were selected to contribute to the data collection processes.

As for the supervisors, the criterion was identified as “working to observe students on the job during their internships in F&B or A&T departments”. Therefore, one general director representing A&T and one chef from F&B participated in the study. The reason for incorporating supervisors from both departments was to reveal the reality and any probable varieties (if they existed) within both departments.

As in most evaluation studies, the overall aim is to assure improvement and adjustment according to the results gained, depending on the phenomena investigated alongside the current users, the opinions of other users who were (or would be) exposed to the phenomena. In our case, graduates' opinions were crucial as they were exposed to the same curriculum and had post experiences that would yield information for achieving the purpose of this study. Regarding the graduates, both criterion and convenient sampling methods were employed. The criterion identified for graduates was "being a graduate of this specific school from either department of F&B or A&T". The sample in this group consisted of two F&B and four A&T graduates.

Data Collection Instruments and Procedures

In this study, interviews, observations, and document reviews were employed as data collection methods. The interview and observation schedules prepared by the researchers served to collect the data as data collection instruments. During and after the preparation of the schedules, expert views were consulted. Eight different interview schedules were prepared to collect data from eight data sources. The data were collected from three student focus groups (n = 18), individual interviews with two mathematics teachers (n = 2), two administrators (n = 2), five vocational course teachers (n = 5), two cultural course teachers (biology and chemistry) (n = 2), five parents (n = 5), six graduates (n = 6), and three practice supervisors who the students work together with during their internships (n = 3), which in total were 43 (n = 43) participants involved into the study voluntarily. Students' focus groups were repeated the following week, and the individual interview transcriptions were member-checked to check for biases. The data from observations and documents (teachers' resource pack, students' notebook artefacts, and samples of the written exam) were collected simultaneously. In total, 14 hours (per 40') of in-class observations were conducted via the observation schedule formed accordingly with a thematic approach.

Following each observation, observation notes were transformed to extended notes, and if necessary for that observation, memos and reflexive journals were kept to check for personal bias. The aim of conducting observations was to use it as a supportive data collection method and identify the students for the focus groups in line with the sampling method. During and after observations, the students of highly, moderately, and low interest and success in mathematics courses were identified via insights of observations, their teacher's opinions, and the database of e-Okul (*e-School, as a School Management System*) in which grades and improvements of students for every lesson were recorded.

On the other hand, the focus groups of the students were conducted and tape-recorded at the school library. The duration of the focus groups varied between 38 to 50 minutes. There were six students whose consents were taken beforehand, both from A&T and F&B departments, in each focus group. The repeat sessions were held a week later to increase the dependability of the study. Meanwhile, the individual interviews were held simultaneously according to the arrangement or the convenient conditions emerging within time. For privacy concerns, the teachers were interviewed at the school library at scheduled times. Three of the graduates were interviewed at a privately arranged cafe. The other three graduates and parents were interviewed via multimedia applications because of the inconvenient conditions for face-to-face interviews. The supervisors were visited at the hotels, and interviews were conducted in private. Procedures conducted were codified and tagged as Fcg (focus groups), Ad (administrators), Vct (vocational teacher), Cct (cultural course teacher), Sp (supervisor), Pr (parent), and Gr (graduate).

Analysis of the Data

The data collected were transcribed using the transcription programs of Express Scribe and Listen N Write. Following the transcriptions of the interviews, the data were analysed via Systematic Content Analysis, inductive coding, and thematising. As the observation extended notes were kept in line with the thematic approach, an extra analysis was not conducted. In the analysis, as the main data collection instrument, the interview findings were supported via the findings in the observations and the document analysis. The results were reported in a triangulated manner.

For assuring the *credibility* of the study, *"prolonged engagement", "persistent observation", "member checks", "peer debriefing",* and *"triangulation"* strategies (Creswell, 2014; LeCompte & Goetz, 1982) were used. Concerning *prolonged engagement*, long-term engagement in the research site was of excellent significance as the responsive evaluation model's major set off bases are built upon this fact to determine whether the curriculum responds to the needs of the context it is implemented in. Eight weeks (two for engaging with the atmosphere and needs assessment, six for conducting observation) were spent actively in the field to meet this criterion.

In terms of *persistent observation* to collect accurate and relevant data, the first two weeks were used to identify accurate data sources. In the following, in-class *persistent observations* were conducted to bring insights into the curriculum: the way it was delivered to the students and how the students responded to the curriculum and the other factors affecting the implementation. Additionally, in line with the *persistent observation* strategy, chats with the teacher were conducted to confirm the observation notes following each class. Furthermore, extended notes were developed and transferred to the digital platform to be kept coded and analysed following each observation. Another strategy called *member checks* was used to ensure *credibility* so that the interview transcriptions could be shown or sent to participants. After the analysis, chats were conducted regarding the results to increase the accuracy.

Another strategy used to confirm *validity* was *peer-debriefing*, in which the two partners checked the design, the model, and the results of the study to confirm the accuracy. As this is a case study design and the responsive evaluation model is employed, collecting data from as many stakeholders and audiences as possible calls for the *triangulation* of the data. *Triangulation* was used in supporting the main data findings of the interviews with observation and document analysis.

Consequently, the *external reliability* of the study was established via presenting the methods of data collection procedures clearly so that other researchers will be able to use the reporting to replicate the study (e.g., Becker et al., 1968; Mehan, 1979; Ogbu, 1974; Smith & Geoffrey, 1968; Wolcott, 1977; LeCompte & Goetz, 1982, p. 10). Concerning the establishment of *internal reliability*, to answer whether multiple observers agree within a study, the data was recorded mechanically to help correct researchers' misperceptions and misinterpretations. In summary, to confirm the *credibility* and *transferability* of the study, more than one strategy was used. In this sense, this study can be said to represent sound credibility and transferability bases.

Results and Discussion

In answering the first research question concerning whether the implementation of the curriculum under concern responded to the context of Tourism and Hotel Management Anatolian High School, various data collection methods were employed. In this respect, focus group interviews with students, individual semi-structured interviews with administrators, assistant managers, and mathematics teachers in charge of teaching this course, observations and document analyses were conducted. As a result of the student focus group interviews, the data's content analysis and open coding revealed that students set a positive relationship between their jobs and mathematics. This course is found vital for both self and business and is perceived as a means of excelling in their job. The self-projection regarding the effective utilisation of this course revealed that students, to a large extent, were unconfident and insecure as they define their ability level only around four basic mathematical calculations.

Additionally, findings suggested the existence of irrelevant content in the curriculum, such as scales and trigonometry. The analysis indicated that daily life connections were set to an extent, though, setting relevance to students' vocations, if at all, was student-initiated rather than teacher-initiated for A&T students while was non-existent for the F&B department. This case is revealed in the student focus group responses, giving insights into the lack of orientation of cultural course teachers teaching in vocational high schools.

> Once I said, teacher, this is like …at the hotel! And she went on like, 'Okay, if you think the way you do it there, you learn easier! She confirmed us but then she drew back and went on her own way of teaching. [Fcg 1]

> …no relevance is set to our vocations. Yet, this is not the teachers' fault. They are cultural course teachers, and they are not familiar with our departments. So, I think they do not know how to relate to our vocations." [Fcg 3]

The analysis of the interviews with mathematics teachers suggested that while teachers were aware of the importance of *actualising information* via *contextualisation*, the ways they could bridge the gap to those students emerged to be no more than the mention of the topics *transforming quantities* for F&B; *percentages* and *profit-loss calculations* for

A&T, rather than the actual reality of those students. Additionally, the analysis of mathematics teachers' responses referred to a lack of satisfaction with the curriculum as it was found to be not appropriate for the context it was implemented and mostly irrelevant to the needs of this specific group of students. One of the teachers mentioned that the language of the curriculum was not addressing this specific group of students.

> Is the curriculum well-suited for vocational high schools? I think not! It is heavy! These are vocational students, and I know they learn more easily when I set connections to their lives. For example, in teaching percentages and profit-loss calculations, a couple of examples for accommodation students can be given, but it is not possible for all topics. [Mt 1]

> Actually, sometimes in terms of daily life, yes, their interest grows when I give examples or ask questions… But, no, we cannot do that (set connection to students' (vocations/departments). Students do not have an interest in the lesson already. [Mt 2]

> We are expected to help the students do better in the university exam. You know! Students leave the school earlier compared to other schools for internships, so I have limited time to finish the curriculum. …we already have common exams in the district. Therefore, all high school students, regardless of the type of school, are assessed compared to the same curriculum. After that, we conduct the second written exam only. Performance scores are given compared to the participation of the students in the lesson, and that is all. [Mt 2]

That is to say, compared to the requirements of the official BM Curriculum, it was found that teachers did not use any project-based assessment practices. Time constraints stemming from the academic calendar reported being shorter than other high schools seemed to be the primary handicap in implementing the curriculum. Time constraints, the pressure put on teachers for increasing the number of students being successful in the university entrance exam and the assessment practices on the district level may have distracted teachers' focus from the essence of the curriculum. From the administrator point of view, the enhancement of mathematics to the students' daily lives was of consensus that this course nurtured students' abilities to set relations among phenomena, analytical thinking, and *setting cause and effect relationships*. Yet, in the implementation of the curriculum, the so-called reasons for not being able to enact the document (the curriculum) as it should be, emerged as *shortcomings of the academic calendar* and thereby resulting in the intensive program implementation, *curriculum coverage concerns*, *disharmony of the curriculum and the school type*.

> ...the aim of vocational education is to raise semi-qualified intermediate staff for the sector. Yet, though not true to say this way but, we enforce the curriculum implemented at other Anatolian high schools to our students. This way, we neither raise students for the sector nor for the university. [Ad 2]

Moreover, the findings underlined the concerns stemming from the *lack of alignment of the curricula;* though the schools would indeed implement the written curriculum at mezzo-level (district level), the performances of the schools were *university entrance exam-oriented,* so it was at micro-level (schools) under the pressure of the number of students entering the university, as well.

> Unfortunately and frankly to say, I am not after daily life or vocational relevance to students' jobs. The district ranks all high schools based on just one criterion: the number of students entering a university! So, if a student can answer four or five questions more, I do not question how the curriculum is implemented. [Ad 1]

In response to the first research question, in the light of the reality uncovered in this context, it can be said that the implementation of the 11th grade BM Curriculum does not respond to the needs of this specific school. To this effect, in line with the insights delivered from the data, the literature also supports that the curricula for vocational high schools should be different rather than implementing the same curricula at all secondary schools as they raise students each for differentiated ends. Accordingly, irrelevant contents should be excluded corresponding to the needs of those schools (Ciftci & Tatar, 2015). Likewise, Aydin et al. (2018) indicated that implementing a particular curriculum at all secondary schools, despite the variation of the type of schools, was almost impossible to achieve. Therefore, different curricula should be built responding to the type of institutions.

On the other hand, Mumcu et al. (2012) emphasised the need for an infusion of daily life when teaching mathematics. As revealed in their study, 'students will like mathematics only if they meet mathematics alive'. Though the other facet, in this case, relates to issues like university-oriented performance assessments of schools based on an overall evaluation of all secondary schools, when the case is learning for self, the reality independent of the reasons uncovered refers to the need for learning and teaching for life.

For the second research question, the endeavour for answers shaped around the teachers' opinions related to the transference of the competencies attained by students via the 11th grade BM Curriculum into the vocational and cultural courses. Three vocational and two cultural course teachers were individually interviewed to answer this research question.

The analysis of the A&T teachers' responses indicated that students' transference of math skills to their courses was *limited* and *not effective*. The data analysis referred to the fact that the reasons for this case were heavily student and teacher-based. Regarding the student-based reasons, concepts distilled such as *low reasoning skills*, *low ability to inquire*, *learned helplessness*, *low self-confidence*, *low motivation*, and *low comprehension abilities* were more about the characteristics of the students.

> …In the exam, I gave a long paragraph which described the hotel in detail including redundant information, as well. What I wanted them was to derive the required information and do a simple direct proportion calculation, but what they did was trying to use all the information given. They could not understand the question. Actually, they know how to calculate, but when they come across a problem, they cannot apply what they know. Indeed, what was required was to derive the required information, multiplying and a simple division. [Vct 1]

> I work with three students this year in the coaching project in our school. When I ask why your math grades are bad? They just answer as 'I am unwilling, I do not like maths! I do not think I

> can ever be good at maths!' Please do not take me wrong maths teachers! But there must be a way to motivate them. [Vct 2]

On the other hand, the concepts emerging as *prejudices against mathematics*, learning via *memorisation* and the *means-oriented approach* of students for GPA rather than handling it as a way of life were more about how students perceive this course.

> There already exist stigmas related to vocational high school students. Unsuccessful students with low grades who cannot do maths go to vocational high schools! So, students come to this school stigmatised as not successful. This is selective perception. They just say, 'I cannot do maths!' …with the anxiety and fear they feel, they just focus on taking good grades for keeping their GPA at a level instead of thinking on how they can use maths skills in their jobs, lives or in other courses. [Vct 1]

As a result, it can be inferred that the students could not see the bigger picture because of the varied reasons mentioned and therefore were missing the chance of seeing the hidden strings among courses. On the other hand, concerning the teacher-based reasons, *assumptions of prior knowledge* of the students, *concerns of curriculum coverage,* and *ineffective use of strategies and methods* were the distilled concepts. In this respect, the analysis of A&T teachers' comments referred to the fact that teachers' assumptions on prior knowledge of the students led mathematics teachers to use terminology or concepts which students know as a reflex by name but do not comprehend its use or logic. As various audiences reported in this school, students were more inclined to establish closer relations with their vocational teachers as they spent most of their time with them. Additionally, as A&T teachers teach accountancy, their observations with students in mathematics experiences were reflective and helpful in answering our research question. To that effect, what emerged was a sincere call to mathematics teachers on how to teach and cooperate.

> There is not a well-tailored maths curriculum relevant to the aims of our school. Our maths teachers have to cover the curriculum in a much shorter time. Students turn back in October from internship and leave again in April. Everybody is in a rush in cultural courses. Therefore, cooperation among teacher groups stays only on paper. [Vct 2]

> If you teach directly via terms or concepts, our students do not grasp what you teach. For example, if you directly use the concepts of active asset, passive asset, students can get scared. Maths is already something like coming from space for them. Therefore, by using simple daily language and real-life scenarios, I believe students can learn maths better. For example, before using the concept of active - passive asset, I start with 'If we lend money to X, …' 'If we borrow money from Y,…'. Maths teachers no offense! I know the curriculum is crowded, but you need to change the way you teach these students a little bit. [Vct 1]

On the other hand, when it comes to facing the results of not being able to transfer math skills into the vocation, the students understand this other facet at the price of *pay cuts* or *loss of jobs*. It is indicated that math skills in students' lives prove their significance sooner or later.

> …when do we pay taxes, what is tax on corporations, how do we pay the income tax, what is a wage, and what do we record daily? What do we do if the guests pay in cash or by credit card? These are all mathematically related questions, but our context is the hotel, and we have to be

> very careful…there is no mercy in business! Even a penny is valuable. Therefore, our students know that when your calculations go wrong, it means you damage the business. You damage my business, you are fired! If lucky enough, they cut the damage from your wage! [Vct 2]

The analysis of the F&B teachers' interviews indicated that the students could not transfer their math skills attained into the F&B courses. The enhancement of mathematics into the qualification of this department emerged to be precious for *reaching standards*, *improving the quality in a restaurant*, *balancing the ingredients in the dishes*, *balancing the portion size*, and *preventing financial loss*. The reality for F&B concerning mathematics emerged as a 'no less, no more' philosophy. Yet, in the light of the analysis, students come to this course with *low analytical thinking skills* and *conceptual problems* (i.e. quantities of solid and liquid) and therefore experience difficulties in the kitchen.

> At the beginning of the term, we teach chopping the veggies. When I ask them to bring a bowl or a cutting board, they bring a quite small or big one compared to the ingredient. Math gains students compare and contrast and analytical thinking skills. [Vct 5]

> …fractions! They do not know what it means ¼. Then, we take a lemon and divide it into four pieces and show a piece that it is ¼. [Vct 5]

The largest two reasons for this case emerged to be the *assumptions of prior knowledge* and *prejudices of students towards* mathematics *courses*. The analysis of A&T and F&B teachers' interviews pointed to the reality that the students in this specific context carry characteristic features; they are already immersed in fear of not achieving mathematics as it is either too abstract or too difficult. Those findings refer to the self-fulfilling prophecy concept (Vanderlaan, 2011) as the failure of achieving the course is blamed on the false self-concepts and beliefs held by the students. The literature in this regard presents overlapping results in that most of the students at vocational high schools suffer from prejudices (Berkant & Gencoglu, 2015), anxiety, and learned helplessness identified in the saying 'I already cannot do maths' undermining their confidence in achieving this course. Additionally, as indicated in the study of Berkant and Gencoglu (2015), teachers mostly employ deductive teaching methods, which also is the case in this study, proving to be ineffective based on the teacher's thoughts. Therefore, in addressing mathematical content, reasoning, and problem-solving skills, teachers need to tailor and provide various methods such as games and drama activities (Bucheister et al., 2017). Different from the findings of Mumcu et al. (2012), according to the perspectives of vocational course teachers in this study, the students were aware of the future effect of mathematics on their vocations and lives rather than underestimating it. Students were found to be more inclined to hands-on activities as they were practising in a vocational and technical Anatolian high school and therefore this point was to be taken into consideration.

In line with this research question, the analysis of the cultural (biology and chemistry) course teachers' responses also indicated that students could not transfer their math skills into their courses, and low awareness was found as the unseen strings among the courses. Difficulties were experienced in the *comprehension of the problems*, *powered numbers*, and *mathematical calculations*. It is indicated that while students were more inclined to listen and learn the topics without numbers, they lose their interest, attention, and motivation easily when it comes to numbers and even four simple operations. Despite the very simple mathematical calculations required in biology and chemistry courses, such as taking the power of a number and basic four operations or proportions, students could not give correct answers because of comprehension problems of terms, questions, and the high anxiety experienced when they encounter numbers. The analysis results revealed that students experienced difficulties and could not transfer what they learnt in mathematics, particularly in the exams, due to not comprehending the terms, concepts, and questions.

> For instance, they know the concept 'powered number', but they do not understand what it means or why we take the power of a number. First, I try to teach the logic behind and then turn back to my own biology issues [Cct 1]

The analysis refers to issues such as *misconception of cultural courses* at vocational high schools resulting in being taken for granted and failure at the micro-level (school); *student profiles* mostly consisted of students with *low motivation*, *low attention span*, *low self-esteem*, *easily gets bored,* and *prejudiced against mathematics*.

> Students mostly think that in this school cultural courses have a minimal effect; therefore, both the cultural courses and teachers are taken for granted. They do not want to learn these lessons. They say, 'teacher if I could do this, I would not come to this school' or 'why am I learning this?' To some extent, they are right! It is quite difficult and redundant for them. [Cct 1]

> …when math comes onto the scene, students with low mathematical abilities get bored because they are not able to grasp and they give up then move away in a minute in the lesson. They already believe that they cannot do maths. [Cct 2]

The responses indicated that students were bringing barriers to learning cultural courses such as mathematics, biology, chemistry, etc. They believed that they could not achieve those courses and would not effectively contribute to their future career. Hence, the students did not show any interest or put extra effort to learn the cultural courses better. In this respect, the following analysis results yielding *implementation of the same curriculum,* using *the same textbooks* with other general Anatolian high schools of which the aim is greatly different, were seen as primary handicaps by the cultural course teachers.

> I think there is a big problem in the textbooks. We use the same textbook and curriculum with the Science high schools. It means you try to raise students with drastically different placement scores with the same method. Latin concepts already make science courses heavier. Then it is natural to hear students saying, 'teacher, what do those concepts (such as hemolysis, meiosis, mitosis) have to do with being a waiter/waitress or manager in a hotel? [Cct 1]

The analysis of the cultural course teacher responses also underlined the issues of *curriculum coverage* which frames teachers' creativity and leads them to enforce the written curriculum (Glatthorn, 2000) as it is rather than enacting a contextualised curriculum.

> If I teach addressing the good students, I lose the lows, if the vice versa, the good ones. The curriculum is set, the yearly plan is set, and I have to finish it. The system is to be changed. [Cct 1]

The third research question probed for the thoughts and opinions of the graduates to uncover whether they were able to transfer the math skills they gained at school. Following the six individual interviews, the analysis yielded those graduate students were aware that they were using mathematics in a wide span, such as making a living, investing, and *planning a budget*. Students in F&B defined the enhancement of mathematics into their vocations as gaining *practicality* and *faster promotion*. In contrast, the A&T students gave various in-depth information and defined the enhancement of mathematics through concepts such as *making decisions for a business*, *reducing failure probabilities*, *profit and loss calculations*, and *keeping financial accounts* in carrying out their jobs. In other words, the concepts emerging in A&T were remarkably different from that of F&Bs.

> Well…While quantities and ratios are important for F&B, for us (A&T), percentages were of quite importance, for example. If they showed us how to use those topics relevant to our departments, maybe for four or six hours a week, with different ways like visuals, smart boards I don't know… We could have used math better. [Gr 6]

As a result, while graduate students did not define themselves as efficient users of mathematics, they referred to different needs in their departments and that different teaching methods would aid in promoting their abilities in using mathematics in their fields, which were overlapping with the results of the student focus groups in that they had different needs.

As is cited by Hurst (2007), connecting students' mathematical knowledge to other contexts is a special type of teaching and is a way of helping students recognise similar situations in the future where they might use approximately the same or related relevant processes. To this effect, the students' inadequacy of setting relevance among courses in this special context may need consideration. Additionally, the call for constructing the curricula responding to differing needs also seems to be an issue for those stakeholders.

Considering supervisors as stakeholders of crucial value as they have the chance to monitor students in internships, the interviews with three supervisors helped shed light on whether the students could transfer their math skills into the field, which answers the fourth research question. The analysis of the transcriptions revealed that math skills were important for the job.

> The students good at maths get used to the job quite fast, they do not cause trouble at all. They are good at quantities and recipes, and it is important for being successful in this sector. I do not want to think the vice versa… [Sp 2]

However, in transferring math skills to real-life experiences, such as internships, students' actions were observed as *limited* by the supervisors. Yet, this is defined as the case for the first year of the internship. The most outstanding concept regarding the research question is *gaining practice*, as the students are found more agile and competent the following years of the internship. In this respect, the supervisors and vocational course teachers in-depth interview results overlap largely in that they merge into the fact that those students learn better via learner-centred instructional methods such as *learning by doing* and *hands-on activities* rather than teacher-centred instructional methods.

> Actually, it is about internship. You know they learn by doing. The second-year they come more prepared and skilful. [Sp 1]

Finally, parent interview results analysis concerning reaching in-depth information of their opinions about the contribution of math skills into students' daily lives, the data revealed informative concepts such as mathematics as a means of equipping students with *compare and contrast skills*, *making a budget*, *consciousness in saving*, *expenditure*, *symmetry, reflection on character*, gaining *high self-confidence* and overall *responsibility* at home and work.

> At the end of 11th grade, he was able to control his expenditures. I did not give him any money. He got the ability to make a living with the money he earned in his internship. To my surprise, he even had a saving account. I think he was able to do the math of his life day by day. [Pr 3]

> Even if the maths he learns does not reflect on making calculations with numbers, it reflects onto his character in his personal life. He calculates, shapes his personal relationships very well. I think that's maths. [Pr 4]

Furthermore, the relations to students' prejudices and fears against learning mathematics were also mentioned by parents. Overlapping with teachers' views it was revealed that students in that specific school were more focused on applied learning and hands-on activities than abstract theoretical concepts, which they experience difficulties understanding. Sasongko and Widiastuti (2019) stated that learning via practise rather than theory is more prevalent in achieving vocational education goals. In line, the resolution suggested by Said (2018) and McNeir (1994) concludes the significance of applied learning in bridging the gap between academic and vocational education.

Conclusions and Implications

In light of the results and discussions, it can be concluded that from the perspective of students, administrators and mathematics teachers that the implementation of the curriculum, to a large extent, fails to respond to the context of Tourism and Hotel Management High School. It is understood that though daily relevancies are set to an extent during the basic mathematics course, relevance to the students' vocations seems to be out of the school's agenda. The failure to set vocational relevance in delivering the BM Curriculum was mainly found to stem from the common top-down curriculum sent by MoNE to all Anatolian high schools. Yet, their aims are almost entirely different, and they host students with different characteristics and needs. Compared to the needs of the students in this school, the existence of irrelevant content in the curriculum seems to produce another problematic issue in setting vocational relevancies. Additionally, the District National Directorate's (mezzo-level) demands and expectations regarding the number of students entering the university at each school seemed to have put big pressure on teachers and administrators. Therefore, it can be concluded that the university-oriented performance assessment approach of the schools at the district level might have inhibited schools from focusing on students' needs and searching for ways to set vocational relevance in the delivery of the curriculum.

Regarding the transference of math skills into vocational and cultural courses, the combined perspective of cultural and vocational course teachers, graduate students and supervisors revealed that students to a large extent were not able to transfer their math skills into the other disciplines or their vocations. The major reasons referred to as the need for more applied learning, hands-on activities rather than an abstract way of teaching, students' prejudices, learned helplessness, and student characteristics are among the most highlighted insights that call for consideration.

Furthermore, based on the insights gained out of the parents' interview results, parents viewed mathematics as an enhancement of students' characters. They also stated that it allowed them to gain responsibilities for work and life, which are the far ends of the curriculum. Last but not least, it could be concluded that Stake's Responsive Evaluation Model was fulfilling the purpose of the study to reach a pluralist view by giving voice to as many individuals as possible to uncover whether the curriculum under interest was responding to the needs of this specific context.

Practical Implications

The data analysis and the overall study results yielded rich insights and implications for decision-makers and stakeholders. Below, the practical implications are presented from a macro to micro-level perspective corresponding to implementation and the top-down execution of BM Curriculum in this specific context. Concerning the implications at the macro-level, there is a considerable amount of data regarding the need for constructing relevant curricula responding to the needs of tourism and hotel management Anatolian high schools. The data analysed has put forward that mathematics teachers, administrators, cultural course teachers, vocational course teachers, and students meet at a central point that the curriculum does not address the audience's needs in this specific vocational and technical Anatolian high school and overlap with the establishments' goals. Additionally, the language used in the curricula was not relevant to the target group. That is, the data analysed in this research implied that the content, the language used, and the goals (objectives) of the curriculum for each type of vocational high school more or less differ from each other. Therefore, the results underline that what a student needs in a tourism and hotel management vocational and technical Anatolian high school in mathematics is different from those studying in a general Anatolian or Science high school.

Moreover, the analysis of vocational teachers' responses also implied that students' needs could differ from one vocational high school to the other. In line with the data analysis, it can be said that the institutions' goals play an important role in what students need. Therefore, another crucial implication for the decision-makers can be to take decisions accounting for the uniqueness of each type of vocational high school as each serves different goals.

Another implication can be referred to the mezzo-level. Comparing vocational high schools and schools specifically established to prepare students for the university entrance exam causes great pressure on vocational high schools. The aim is to raise intermediate staff for the concerned sector, not for the high-stakes exams. This causes vocational high schools to lose track and achieve neither their establishment goals nor their ability to compete with other schools. Therefore, it can be suggested to search for and create new alternative methods to assess the achievement of vocational high schools. Besides, at macro and mezzo-level, in-service teacher training can be mentioned as another implication to be considered. Based on the findings, the cultural course teachers were non-familiar with the departments in the vocational and technical Anatolian high school they were teaching and needed orientation. The statements of the students and vocational teachers gave insights that when cultural course teachers are assigned from other schools to teach in a tourism vocational and technical Anatolian high school, they experience difficulties in teaching. There could be many reasons for this case. Yet, according to insights, teachers experience difficulty giving examples, providing explanations using the context (hotel) the students work at and creating questions relevant to the students' departments as they do not know much about how the hotels run or how people work there. It can be suggested that the case of cultural course teachers may act as an inhibition to contextualise learning and teaching. Therefore, based on the results, it can be suggested to give orientations to cultural course teachers at schools or in-service education in the districts that would enable them to adjust their teaching according to the needs of that specific group of students.

At the micro-level, the implications are related to the implementation of the curriculum in the field. The insights gained from the study suggest that the teacher groups should set a sound communication among each other. Hence, the data implied that teachers need to negotiate both before the academic year to arrange the flow of the common topics and set a reasonable flow during the academic year that would enhance each other's work and during implementation to find solutions for the problems. This analysis provided a basis for the practitioners in the field with insights that would be helpful as "providing vocationally relevant vocabulary, providing the meanings and explanations of the concepts they teach, using jargon relevant to students' departments in preparing materials, contextualising teaching, simplifying the way of teaching, and using more applied ways to teach".

Future Implications

Though the study cannot be replicated as it is a case study design, the methodology would give insights to future studies. The results have rich data revealing the case through the lens of different perspectives. This study served to give voice to varied stakeholders and gave crucial insights at macro, mezzo, and micro-level implementations of the curricula. Therefore, more studies are needed to improve these types of schools with different needs to communicate the problems in implementing the curricula. This study was conducted in a tourism vocational and technical Anatolian high school, yet there are many vocational high schools with different needs such as Fine Arts, Industrial and Health, and Sports. Additionally, further studies on mathematics or different subjects would support and give insights to implementing and constructing the curricula for those schools. Furthermore, the results derived from such studies are reflecting the ecological site of the implementation. Therefore, future studies would help schools reflect on and initiate action research to improve their current conditions.

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An Action Research on Teaching Natural Numbers to the First Grade Primary School Student with Low Readiness[*]

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Abstract: This study was designed as an action research with the aim of overcoming the deficiencies of a first-grade student with a lower level of readiness in mathematics. The participant of the study was a first grader studying in a public primary school in the district of Haymana, Ankara during the second semester of the 2018-2019 academic year. The teacher's in-class observations, examination of the students' homework notebooks, and familial interviews were taken into consideration in the selection of the participant. Observations and interviews were conducted as a preliminary study to determine the student's level of readiness for mathematics lessons. İt was seen that there were familial and educational reasons for the students to have difficulty in learning mathematics subjects. İn addition, an action plan was prepared because the student was behind his peers in terms of adaptation to school, literacy, and social development and it was aimed to obtain the first term gains. The study revealed that the student was successful in activities such as rhythmic counting, meaningful counting, one-to-one correspondence, quantity comparisons, addition, and subtraction while his confusion with number conservation remained. As a result of the obtained findings, it is predicted that raising the awareness of parents about the readiness of children of preschool age will positively affect their school success and hinder the problems described here.

Keywords: Primary school, readiness, natural numbers, action research

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Introduction

Given that education is a behavioral change process, it is paramount to identify and evaluate the difference between the starting and ending process. The difference is defined as "acquisition" (MoNE, 2018), "learning outcome" (Yakar, 2016; Yesilyurt, 2019), or "educational outcome" (Demircan, 2018), particularly in the field of curriculum and instruction. Behavioral change in an individual depends upon various factors such as the time allocated to the subject, the structure of the subject, active participation, feedback learning method (Bacanli, 2011). The student's motivation level, development level, age, and prelearning influence the learning process considering the factors related to the learner. The more advanced the student's pre-learning is, the more improved and meaningful their new learning becomes (Senemoglu, 2018).

The schools, where formal education is conducted in order to support an individual's behavioral change, expect learning proficiency to be ready for the related learning process. The ability of a student involved in any educational process to acquire the targeted acquisitions during the learning process depends largely on the prelearning activities. İn other words, students must acquire sufficient acquisitions at a school education level in order to have them gain the defined competencies at the education level. İt is a well-known fact that the cumulative progress of learning hinges on this situation. (Olkun & Toluk Ucar, 2007; Van de Walle, Karp, & Bay-Williams, 2012).

The Primary School Mathematics Curriculum covers a gradual and sequential structure that starts with natural numbers and then moves onto operation skills (MoNE, 2018). İncomplete learning in one subject may lead to a deficit understanding of the next subject. The development of the concept of natural numbers in primary school has a critical significance in terms of teaching all other subjects. The subject of natural numbers should be taught gradually and sequentially. Skipping any of the stages may cause numbers to be memorized without making any sense of them (Olkun & Toluk-Ucar, 2014). By adopting an approach from concrete to abstract in numbers teaching, actions can be done by first passing to the phase where real objects, object pictures, and then representations and finally numbers are used without using any objects or representations (May, 2001; Olkun & Ucar, 2007). Based on all the above-mentioned statements, it is wise to mention that mathematics instruction is a gradual process and the concept of readiness is one of the key concepts for further learning.

Conceptual Framework

Readiness is an extremely comprehensive concept that includes the student's previous learning, interests, attitudes, abilities, and health conditions, and it is defined as "reaching certain competence and behavior styles along with performance levels at the organism's cognitive, affective, and psychomotor level" (Topses, 2003, p. 25). The concept of readiness also means that the nervous system is ready to learn (Binbasioglu, 1995), that the individual acquires the necessary prerequisite behaviors in order to perform a learning activity (Ulgen, 1997; Yilmaz & Sunbul, 2003), and that the individual reaches a level where he/she can perform a developmental task through maturation and learning (Basaran, 1998). Bloom (1995) considered the level of readiness, which is pivotal for the education process, as a notable part and input of the learning-teaching system. Basar (2001), on the other hand, indicated that the occurrence of a new behavioral change in an educational platform depends on the student's readiness level and that having cognitive, affective, and psychomotor behaviors is a prerequisite for this.

The national and international literature revealed that the studies conducted on readiness heavily focus on pre-school education (Bagceli-Kahraman, 2012; Ergul, et al., 2014; Hatfield, et al. 2016; Kutluca-Canbulat, & Yildizbas, 2014; Magnuson, Meyers, Ruhm, & Waldfogel, 2004; Yesil-Dagli, 2012; Ziv, 2013). Therefore, it is remarkable and necessary to carry out studies for all levels of education in this field (Harman & Celikler, 2012). Counting is one of the basic skills for primary school students' mathematical thinking development, and the accurate and meaningful activation of this skill is related to the proper implementation of some counting principles (Olkun, Fidan, & Ozer, 2013).

İn their study, Gelman and Gallistel (1986) proposed the following principles so that students can possess counting skills.

The stable-one principle means that the numbers are always in the same order,

The one-one principle involves the assigning of one or only one counting word to each of the items in a collection of items,

Cardinal principle means that the number allocated to the final counted object in a collection indicates the number of items in that collection,

The abstraction principle means that counting can be applied to any collection of objects,

The order-irrelevance refers to the fact that the order of the objects in counting is irrelevant.

Among those, the stable-one, one-one and cardinal principles significantly shape the development of children's counting skills (Gelman & Gallistel, 1986). Nye, Fluck, and Buckley (2001) stated that these principles describe both the procedural skills required for counting and the conceptual knowledge regarding counting. İn this vein, it is of utmost significance to evaluate each of these counting skills one by one in terms of the first-grade students' readiness to count.

Upon analyzing the related studies conducted in the field, Magnuson, et al., (2004) discussed the effect of participation in childcare and early education on children's school readiness as measured by early reading and math skills in kindergarten and first grade. Unutkan (2007) sought the primary school readiness levels of children with and without any pre-school education, based on their mathematical skills, in terms of their age, gender, and socio-economic levels. Yangin (2009) evaluated the students' school readiness through the "Metropolitan Maturity Test" with sound awareness. Stephens, et al., (2017) examined the primary school students' readiness towards early algebra to represent and generalize operations. One of the common conclusions of these studies is that the first-grade students' readiness for primary school differs from one student to another and that some students lag far behind other students.

Promoting the readiness of students whose readiness level is low for various reasons, especially in the first grade, will also be effective in making the further grade learning processes meaningful. Eliminating readiness at the first grade and earlier level may be more constructive in order not to have too much learning loss. The action research studies conducted in general terms have been mostly conducted on improving reading and writing skills (Akyol & Kayabasi, 2018; Akyol & Sever, 2018; Akyol & Kodan. 2016; Turkmenoglu & Bastug, 2017; Sidekli, 2010). No study was found within the scope of mathematics lessons in the primary school period except for the action research conducted by Koc and Korkmaz (2019) to teach addition and subtraction operations to an illiterate third-grade primary school student with dyscalculia. İn particular, it is necessary to pay attention to the deficient work done in the first class before coming to the bigger classes in order not to experience too much learning loss in the future. There is no such study specifically published on overcoming the deficiencies of the first-grade student regarding math. To overcome these deficiencies, this study used readiness skills such as rhythmic counting, meaningful counting, conservation of number, minority-multiplicity comparisons, one-to-one correspondence (Baykul, 2016); counting principles (Gelman & Gallistel, 1986), classification, sorting, grouping (Olkun & Toluk-Ucar, 2007), addition and subtraction together with natural numbers. Following the order of tangible materials, pictures, representations, and symbols (May, 2001), this research is critical in terms of directing teachers who are practitioners as well as academics who work in the area. Having an action research model, the study is grounded on such a question: "How can the deficiencies of the first-grade primary school pupil with low readiness level be overcome compared to his/her peers?".

Method

This section covers information regarding the study design, participant information, the environment and atmosphere where the study was conducted, data collection tools, the stages of the study, the process of identifying the readiness level, the preparation, and implementation of the action plan.

Study Design

This study is an applied action research conducted to overcome the deficiencies of the first-grade primary school student with low readiness level within the scope of mathematics course and to provide solutions. Action research refers to studies involving data collection and analysis processes in which a practitioner or a practitioner and researcher carry out the study together, the emerging problems are revealed or a solution is sought to an existing problem. Action research is divided into two as applied and participatory action research. Applied action includes studies aiming at the development of both students and their performance in teachers' classroom environments (Creswell, 2017; Yildirim & Simsek, 2016).

Validity and Reliability

The terms credibility, transferability, dependability, and confirmability are used to ensure the validity and reliability of qualitative research (Creswell, 2016, cited in Lincoln and Guba). İn qualitative research, interviews and discussions with colleagues can be used to ensure the reliability of the study (Creswell, 2016; Merriam, 2018). A "Validity and Reliability Committee" was established to make an expert evaluation within the framework of this study.

Two field experts' views were sought about all processes of data collection, data analysis, preparation, and implementation of the action plan. Besides, various data collection methods were used for the validity and reliability of the study. This technique, called triangulation, employs multiple data collection sources and the participation of more than one researcher (Creswell, 2016; Merriam, 2018; Yildirim & Simsek, 2016). This study deployed different data collection tools such as readiness tests, mathematical activities, observation forms, and interviews.

Participant

The study was conducted with a student who had a low readiness level and difficulties in mathematics, and who was in the first grade of a public primary school in Ankara Haymana district. Prior to initiating the implementation, Demir and his family were met and their permission was obtained for his participation in the educational practices prepared within the framework of a special plan. Permission was obtained from the participant and his family in order to turn this process into research and publish it as an article. The family and the participant signed the consent and were informed in detail that some activity processes would be shared in the study. The student was selected by purposive sampling method, and he was designated as "Demir" by holding his name back in correspondence to ethical rules. Only Demir was included within the scope of the study since he was behind his peers in terms of all readiness skills according to the results of the readiness test administered to the whole class. Moreover, teachers' observations showed that Demir had no mathematical skills except for counting up to 10 in the class.

Demir's father was a laborer and his mother was a housewife. He was the eldest of three children. His family stated that Demir had difficulties in communicating with others except for his mother before he started school, that he did not receive pre-school education, and that he did not work hard at home for school preparation. Demir's family also indicated that he was reluctant to come to school, he had difficulty in communicating with his friends and in complying with the rules required by the social environment in the first months of school. They also clarified that he made friends in the months to come, he came to school willingly, he adapted to social environments as a behavior, he was willing to learn, and he enjoyed the reading and writing process. The student terminated the literacy process behind his friends.

The primary school teacher mentioned that the student was cognitively behind his peers in the mathematics lesson. İn addition, his family and the teacher confirmed that the participant started to read and write at the beginning of the second semester of the academic year, and thus he had no mental retardation. Following the consolidation of the literacy process, Demir began to learn mathematics after his deficiencies were detected with this additional study in the last months of the second semester during the 2018-2019 academic year.

To determine the student's deficiencies in the mathematics lesson, he was observed during the lesson, an interview was performed with the student's parent, his notebooks were examined, and lastly, the readiness test developed by Paydar, Dogan, and Sahin (2019) was administered. The results revealed that the participant did not have any of the readiness skills such as rhythmic counting, one-to-one correspondence, meaningful counting, conservation of numbers, and minority-multiplicity comparisons (Baykul, 2016; Olkun & Toluk-Ucar, 2007). Therefore, Demir could not gain the learning outcomes of the mathematics course at the level predicted by the curriculum, and hence having difficulty in learning.

Working Environment and Atmosphere

All the activities were carried out in an empty classroom of the school. Since one of the researchers was Demir's teacher, an empty classroom was preferred so that they could always use it in the same school. Demir's teacher had a bachelor's and master's degree in the field of primary school teaching and was continuing a doctorate education in the related field. The other researcher was a faculty member who continued doctorate in mathematics education in primary school teaching. The status of the class was described according to the researcher's observations in the classroom and the achievement levels of the learning outcomes in the mathematics curriculum. There was no illiterate student in Demir's class. The majority of the students achieved the learning objectives required by the mathematics course. Others had the required readiness level for the mathematics course.

They could do almost all of the activities within the scope of the mathematics teaching course and achieved the learning outcomes within the mathematics course curriculum. The researchers' observations suggested that students in this class were interested in school and learning, notably mathematics. The students had generally low and middle socioeconomic levels. Students differed across their academic achievements. They were evaluated and raised by taking individual differences into account. Teachers' and parents' observations were noted regularly for each student. The teacher routinely met parents to improve student status, to evaluate the functionality of the activities, to plan the next stage, and to ensure the continuity of similar reinforcing activities and games that help teach the lesson at home. Communication with parents made a major contribution to learning. The communication process established with Demir's mother contributed greatly to his development. The parent's interest and support made the process more effective and easier.

Data Collection Tools

Readiness identification test: İn order to determine which skills such as rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, and conservation of numbers, which are the required skills for the readiness level related to natural numbers in mathematics teaching Demir had, this study employed the readiness test used by Paydar, Dogan and Sahin (2019) in their studies. The test was used to diagnose problems before implementation and to test the functionality of the application after implementation. Since the test was prepared for the first-grade students who were just learning the literacy process, the questions were asked by the teacher and responded by the student.

Mathematics activities: Activities to be used in the student's learning process and those performed through using representations in the process. The written activities were taken from the math activities book prepared by Toptas and Karaca (2019). The activities suitable for the level were selected after asking the opinions of a field expert lecturer and primary school teacher. The following criteria were adopted to determine the eligibility of the activities:

1. Having visual content suitable for the student's age range.

2. Objects that were familiar in daily life and that were frequently used in the class were selected in the activities performed with tangible objects for all skills.

3. Attention was paid to ensure that the paper activities included the relevant skill.

Observation form: The parent and the teacher filled out the form independently of each other to get to know the student better and to determine the difficulties of the student. İn this regard, a semi-structured observation form was used. The form secures more systematic data collection. Participant observation type was used while making the observations (Buyukozturk, 2011). The researchers sensed that it would be necessary to have information about the academic and social development of the student in the pre-school and school period in order to determine the underlying reasons behind the deficiencies in math, and thus the observation form consisted of these dimensions. Another dimension to overcome the student's deficiencies was to examine the independent observations of both the parent and the teacher. The form got its final version by adding some dimensions in line with expert opinions. The observation form filled by the parent included the student's social and academic development before starting school and throughout the school process. The form illuminated that the student did not communicate with anyone except for his mother during the pre-school period even though he grew up in a large family. Besides, the student did not develop a line of friendship during this period. İn the school period, however, he was found to have difficulty in communicating at the beginning, he could not manage friendships, and that the process was relieved later on. İt was also highlighted that he did not receive academic support from family or any institution in the pre-school period.

The observation form filled up by the teacher involved the student's social and academic development from the first day of school. The student was unwilling to come to school when he came to school for the first time. He always wanted to be with his mother. He had some difficulties in communicating with his friends in the classroom environment and in obeying the classroom rules for a while. He mentioned his unwillingness to come to school during the first semester; instead, he wanted to spend time with his mother at home. İn the academic sense, some statements implied that the student with a low readiness level had no counting skills. The researchers prepared the form.

İnterview: Negotiations were made with Demir and Demir's mother from time to time. The unstructured interviews were preferred in the present study. An Unstructured interview provides freedom and aims to obtain rich and sufficient information with open-ended questions (Buyukozturk, 2011). The purpose of the interview is to design an action plan for the student's development before the research. The objective of the interviews that continued from time to time was to obtain information regarding Demir's development process. Conversations were treated about Demir's academic and social development. Here are some examples of these conversations: "Demir, how do you think it feels to come to school?" Demir responded, “Actually, the school seems to be getting better now. Ercan and Faruk start to play with me. We start to hold a match. We also share our food. İ will teach my brother what İ have learned.” He was asked, “What kind of lesson do you think math is?”. He said, “Actually it is fun. There was a question with an elephant in the lesson yesterday. İ got a star for that question too. İ counted my toys yesterday at home. Will you study with me again in Ahmet teacher's class after school?”. The conversations showed how the student went through this process. Likewise, those with the parent suggested the positive aspects of the student’s development.

Data Analysis

Data analysis proceeded concurrently with data collection. The descriptive analysis method was used during data analysis. The interviews and observations that would be used to design the action plan were initially analyzed and the action plan was prepared within this framework. İnterviews with the parent and student lasted throughout the process. These conversations were chatty. Essential information about the student's development was noted after the interviews. Particularly, the interviews held before the action research contributed to the development of the action plan. The evaluation of the interview notes confirmed that the student did not have any other skill apart from counting up to 10. The independent observation forms filled by the parent and teacher provided detailed information about the student's status and contributed to the creation of the action plan. The observation form, which was analyzed through the use of the descriptive analysis method, was evaluated in terms of the student's academic, social, pre-school, and school development. The student was evaluated based on these dimensions, and it was concluded that his current situation was suitable for learning mathematics, considering the progress he made in coming to school and the learning process. The proficiency level in mathematics was evaluated and the action plan was shaped in terms of the student’s academic development.

The portrayal of the data boosts us to make some interpretations, evaluations, and conclusions. Descriptive analysis includes summarizing and interpreting the obtained data according to predetermined themes. The qualitative data acquired for descriptive analysis is organized into a framework, and the themes under which it will be presented are determined. Data are presented under these themes (Yildirim & Simsek, 2016). The findings were analyzed under the themes of rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, and conservation of number, which are the required skills for preparation for natural numbers, as asserted by Baykul (2016), in line with showing with symbols and addition-subtraction operations added by the researchers. İn addition to these 5 themes, 2 more themes were added to the data analyzed by the field experts, namely, showing with symbols and addition-subtraction activities. Necessary arrangements were made by discussing the issue of agreement and disagreement.

A total score was obtained by giving 1 point for each correct answer and 0 for the wrong one in the analysis of the readiness test. Each item of the test included one of the natural numbers readiness skills. The student's responses to the prestudy test contributed to the formation of the action plan. The results of the test administered at the end of the research revealed the student’s proficiency level by identifying which of the readiness skills the student responded to and which he did not.

Stages of the Study

This section includes some actions carried out to identify Demir's readiness level.

A- İdentification of readiness level

İn an attempt to identify Demir's readiness level, he was first asked to count rhythmically to measure the skills of rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, and conservation of numbers.

Rhythmic Counting: The student was determined to count from 1 to 10 and make jumps while counting from 10 to 20. Demir could not count more than 20.

Meaningful counting: A group of items was given to the student and he was asked to count these objects one by one. The student could not comprehend that each object corresponded to a number symbol while counting the items. He was observed to put more than one object while saying a number at first. After the teacher's warning that he put an object for each number, the student could count the objects up to 10 one by one, yet the student failed as he could not rhythmically count more than 10 items.

One-to-One Correspondence: İn one-to-one correspondence, the student was asked to match the beans of two different colors and express their amounts. The student was unable to complete this stage successfully. He could not comprehend that each object corresponded to per object.

Minority-Multiplicity comparisons: The student was asked to identify the groups with fewer and more than two objects. At this stage, the student failed to determine which group had more or fewer objects. The student could not determine which group had the most, either by matching the objects one-to-one or by counting the number of objects in both groups.

Conservation of number: The student was given the same number of objects in two groups, in bulk and scattered, and he was asked which group had the greater number. The student said that the scattered object group had more.

Expression of numbers with symbols: The student was asked to count a group of objects fewer than 10 and to write the symbol of the number corresponding to the number of objects he counted in his notebook. Although the student counted the objects correctly, he could not write the equivalent of the amount as a symbol. All numbers were told to the student verbally and he was asked to write down the numbers. Still, the student could not write the numbers that were said. Based on the observations made during the lesson, the student copied the figures to a large extent by looking at them. Some errors occurred in the writing of the numbers. The student also failed when asked to set aside as many object groups as the written numbers represent. Even if he could set aside a group of objects up to 10 when verbally expressed in numbers, he was unable to separate the amount expressed in numbers in written form. The student could not match the quantities expressed by the objects with the number symbols.

The situation of increasing and decreasing the number: Demir was able to express that the objects increased over time when additions were made to the given object. Having realized a decrease with the decrease of the objects, Demir could not make sense of this in terms of quantity. İt may be wise to mention that Demir's knowledge about increasing and decreasing numbers is visually nothing beyond a lot or a little.

B- Preparation and implementation of the action plan

Demir and his mother were interviewed during the preparation of the action plan. His willingness was interrogated while chatting. Demir stated that he was happy as he learned to read and write, that he played more comfortably with his friends now, and that he wanted to teach his brother what he learned. Meanwhile, Demir was determined to communicate easily with his teacher compared to the beginning of the year, explain the subjects he had difficulty with, and was able to ask his teacher's support. Demir was asked whether he wanted to count numbers, to do math activities as easily as his friends, and whether he wanted to play games in math class with ease. Demir, on the other hand, concluded that he wanted to learn, to enjoy doing the activities and games in the mathematics lesson, and to teach these activities and games to his brother. Demir's mother emphasized that Demir came to school willingly; moreover, succeeding in the reading and writing process increased Demir's self-confidence, yet the student had many deficiencies in mathematics lessons and had difficulties in this regard.

Preliminary studies, observations, and interviews were conducted to determine Demir's readiness level for the mathematics lesson. The reason why Demir had difficulty in learning mathematics was that he did not receive any education before starting school and had no knowledge of mathematics except for being able to count to 10. Demir could not learn the skills of rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, and conservation of numbers, which are the readiness skills for mathematics, and other skills within the scope of the mathematics lesson together with his peers. The acquisition of these skills was emphasized in the first period since he was behind his peers in terms of adaptation to school, literacy, and social development.

Afterward, the national and international literature was examined on this subject, and the most appropriate approach for the student was adopted by taking a field expert's opinions. Grouping classification and sequencing skills are significant elements in teaching natural numbers. The student was provided with the development of grouping, sorting, and classification skills, which is essential for teaching numbers, in number teaching; furthermore, the skills of rhythmic counting, meaningful counting, one-to-one correspondence, conservation of numbers, minority-multiplicity comparisons, which are needed for readiness for natural numbers, were taught and the teaching process ended with activities that required simple addition and subtraction in natural numbers.

The study took place in the second semester of the 2018-2019 academic year. The acquisitions, tangible activities, and paper activities were determined and daily plans were prepared. Toptas and Karaca's (2019) math activities book was used as paper activities. Thus, the teaching process was planned and implemented as 25 lesson hours. This process took place in the classroom where the participant was studying and on the predetermined days and times. Necessary precautions were taken against the stimuli that would distract the student (noise, removal of material from which the student would cheat, etc.). Table 1 depicts the action plan implemented in the process:

Table 1.

Applied Action Plan

Lesson	Activity	Time
1st lesson	Activities related to rhythmic counting by 10s and 5s were performed.	25 min.
2nd lesson	Activities related to rhythmic counting by 10s and 5s were performed with rhythm accompaniment.	25 min.
3rd lesson	Rhythmic counting from 1 to 50 was done accompanied by rhythms.	25 min.

4th lesson	Meaningful rhythmic counting was performed with 1, 5, and 10 real items up to 100.	25 min.
5th lesson	Meaningful counting backward from 20 was performed with real items.	25 min.
6th lesson	Activities were done on the principle of separating the specified entity amount and order independence.	25 min.
7th lesson	The activity was conducted to find the number of a given set of objects	25 min.
8th lesson	One-to-one correspondence activities were carried out with tangible objects.	25 min.
9th lesson	A comparison of minority and multiplicity tangible objects was made.	25 min.
10th lesson	A comparison of minority and multiplicity was made based on intuition.	25 min.
11th lesson	Conservation of number activity was performed according to scattered and aggregated objects information.	25 min.
12th lesson	Conservation of number activity was performed according to scattered and aggregated object information.	25 min.
13th lesson	The student was taught to write the symbols corresponding to the numbers (0-9) (by counting objects).	25 min.
14th lesson	The meaning of zero, decimal, and one were taught as a unit.	25 min.
15th lesson	Exercises about decimals and units in numbers up to 20 were done.	25 min.
16th lesson	The student was taught to write number symbols. (Spoken verbally from 1 to 20)	25 min.
17th lesson	Minority-multiplicity comparisons, one-to-one correspondence, and conservation of number principles were revised.	25 min.
18th lesson	Activities were performed for reading the numbers given with the symbols between 0-20 and writing the numbers spoken verbally with symbols without any clue.	25 min.
19th lesson	İncreasing and decreasing operations were performed with a group of tangible objects and examples from daily life (İ bought it from the market, gave it to a friend, etc.). The formation of the increase and decrease process was taught.	25 min.
20th lesson	Addition activities were carried out with representations. The meaning of the "+" symbol was taught.	25 min.
21st lesson	Activities were done related to number symbols addition up to 20.	25 min.
22nd lesson	Subtraction activities were carried out with representations. The meaning of the “-” symbol was practiced.	25 min.
23rd lesson	Number symbols addition activities up to 20 were held.	25 min.
24th lesson	Both addition and subtraction operations were performed with number symbols in writing.	25 min.
25th lesson	All learned information was revised.	25 min.

Table 1 displays the activities and the duration of the activity in the action research process. The implementation lasted 25 lesson hours in total. Each lesson was planned and retained for 25 minutes.

In order to carry out this study, the ethics committee permission was granted by the Social and Human Sciences Ethics Committee of Kahramanmaraş Sütçü İmam University with the decision dated 22.04.2020 and numbered 2020-11.

Findings

The results of the readiness test, the observations, and the interviews suggested that the student did not possess any skills except for counting from 1 to 10 within the scope of the mathematics course. İn this line, the activities related to rhythmic counting, meaningful counting, representation with symbols, one-to-one correspondence, minority-multiplicity comparisons, conservation of number, addition-subtraction were implemented and the findings were depicted under these themes. Besides, the results of the readiness test were depicted as findings.

1. The stage of rhythmic counting: At first, a verbal counting activity up to 10 was performed with the student. Afterward, an activity regarding rhythmic counting by 10s was done. The activity was reinforced by making use of counting 10s song while making rhythmic counting by 10s. Then, counting activities by 5s up to 100 were carried out. Verbal counting activities were conducted by keeping the rhythm up to 20, 30, 40, 50, 60, 70, 80, 90, and 100, 1 by 1 respectively (rhythm was kept by clapping hands and hitting the table). The student said the numbers by skipping and in mixed order (11,13,18…etc.). Counting activities were practiced by starting from any number in order for the student to reinforce what he learned. All these activities were consolidated with the use of symbols. Activities related to rhythmic counting were performed on paper.

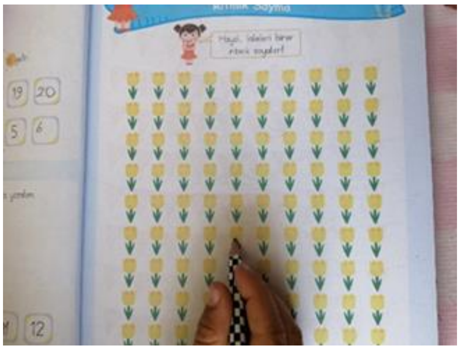
2. The stage of meaningful counting: Counting activities were carried out with desks, boards, pencils, sugar cubes at school. By making counting with different object groups, the student was taught that all entity groups could be counted (principle of abstraction). T: “Can we count the tables?”. D: “İ guess so” T: “Can we count the small balloons on the board? D: “Yes, teacher” T: “But can we count everything?”. D: “Ummmm (thinks about 1 minute). Yes, teacher." The student was introduced that the number increases when every object from 1 to 20 is added. The student was taught that each number word corresponds to an object (the one-to-one correspondence principle). T: “One, two, three…etc. When we put each bean in, we say the numbers in order.” D: “Yes, teacher, because we are adding new beans.” The student was taught that the order of numbers was stable while counting with objects (stable-one principle). Counting is done by counting different objects, emphasizing that the numbers were stable while counting each object. Later on, the student was trained to count backward by decreasing 20 objects by 1. While taking the bulk beans one by one, the student was posed a question. T: "What's going on with the beans, Demir?" D: “Teacher, we take the beans in hand, there are fewer beans on the table.” The student learned that the number decreases in countdowns. At this stage, the student understood that the last counted object represented the total number of objects (the principle of cardinal number) after he was taught that each object corresponds to a number. T: “How many beans are on the table?”. D: “12”. T: “How did you know?”. D: “İ counted them”. T: “What did you say last time?”. D: “12”. T: “Then the last number said …”. D: “İt shows us how many beans are there”. The acquisition of rhythmic counting by 10s was reinforced at this stage with counting activities by grouping the sugar cubes by 10s. Thenceafter, meaningful counting activities from 1 to 30, 1 to 40, 1 to 50, 1 to 60, 1 to 70, 1 to 80, 1 to 90, 1 to 100, respectively, were made step by step. Plastic beans (representations) were used at this stage of meaningful counting activities. Since the student learned to count by 10s, he smoothly understood counting up to 100. The student was asked to count a group of objects in different colors and to say how many objects there are. He was able to predict the total number. When the student was asked how many objects there would be while the counting process started with an object of a different color, he could not express that the total would not change. T: “Demir, how many beans are there on the table?”. D: “12” T: “Alright, if you started counting from orange-colored beans, how many beans would there be?”. D: "Ummmmmm, İ don't know." The student was requested to say what the number of objects was, starting with a different color each time until he used all the colors. He realized that the number of objects in the group would not change no matter the object one started with (principle of order-irrelevance). Tangible activities were strengthened with exercises on paper.

Figure 1.

Meaningful Counting Activity with Tangible Objects

Figure 2.

Meaningful Counting Activity with Objects.



3. Representation with symbols: At this stage, the student was taught the mathematical symbol corresponding to each object. The student was instructed to write the numbers from 1 to 9. The shape of the symbol was initially displayed by counting a group of objects in order. Thence, he was asked to write them following the spelling rules. Then, the student revised the number of counted objects and symbol matching using visuals (pictures). The student was enlightened about the meaning of zero with the help of various case studies from daily life. T: “How many apples are on the table?”. D: “Not at all, teacher.” T: “How many animals do we have in our class?”. D: “There is none.” T: “There is a symbol showing nonexistence”. These examples enable us to teach the meaning of the non-existence of zero with the countdowns practiced before, its correct production as a symbol was taught. The difference between the number zero (0) and the letter "o" and the production method was emphasized so that the student did not expose to ambiguity. After that, the formation of the number 10 was taught to the student through activities and the instruction of two-digit numbers was realized. Two pots were placed. The student was requested to put 9 sugar cubes in one of them. When asked to add 1 more, the student could count 10 sugar cubes. When there were 10 sugar cubes, they were transferred to the other pot. This activity lightened the student about the idea of how the second digit of a two-digit number was formed. The student grasped the formation of a single unit by sticking 10 sugar cubes. İn favor of this activity, the formation of decimals and units in numbers was tangibly taught to the student. Numbers up to 20 were expressed in representations (base ten blocks). Then, the writing of numbers up to 20 was presented. The numbers whose spelling was learned up to 20 were expressed with symbols and divided into decimals and units. (The instruction of zero, decimal, and unity concepts were all taught after one-to-one correspondence, minority-multiplicity comparisons, and conservation of number principles.)

Figure 3.

Displaying Numbers with Symbols.

Figure 4.

Matching Object Quantity and Symbol.

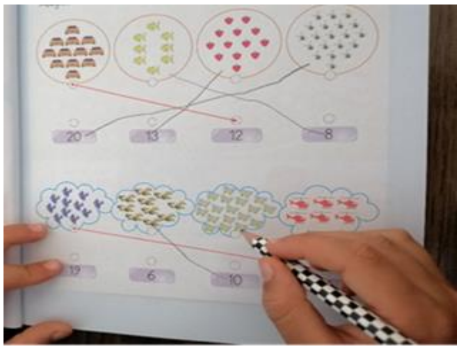


Figure 5.

Writing Abstract Symbols by Heart.

Figure 6.

Development of the Concept of Decimals.

4. One-to-one correspondence: At this stage, the student was asked how to find out which of the objects was less and which was more. The student gave wrong answers by making wrong guesses. D: “Because it looks more.” The student was asked to match the given pencils and erasers with each other. The teacher and the student discussed how this situation emerged using a large number of unpaired pens and erasers and the small number of pens and erasers. Because it will be the basis for the student to gain the concepts of less, more, and equality in the comparison of numbers. The correspondence activity was performed repetitively by increasing or decreasing the number of pencils and erasers, and that the student was taught which object group was larger and which group was less.

Figure 7.

One-To-One Correspondence Activity with Tangible Objects.

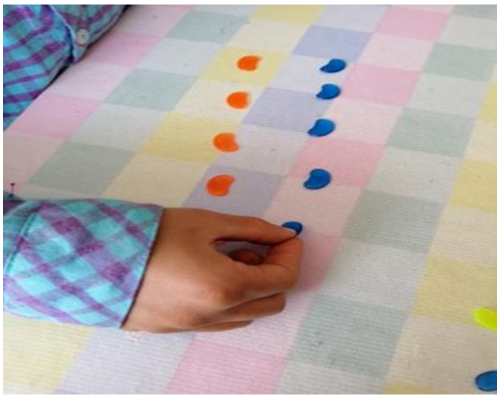
Figure 8.

One-To-One Correspondence Activity with Representations.

5. Minority-multiplicity comparisons: Minority-multiplicity comparisons can be divided into two stages: intuitive comparison, which is the stage before one-to-one correspondence, and one-to-one comparisons (Baykul, 2016). Prior to the concept of conservation of numbers, two stacks of pencils with different numbers were placed on the table and the student was asked to guess which one was more. The student could readily make this prediction. Then, he was asked to guess which one was more by giving a close number of pencil stacks. The student had difficulty estimating at this stage. D: “Teacher, İ think they are the same.” The student was asked how to get an answer to this question, and no answer was received. The students were reminded of the one-to-one correspondence activities. Then, some activities were carried out to have the student understand one-to-one correspondence or counting less, more, or equal number of objects. At this stage, when the student was asked which of the collection of two objects was more, he made an intuitive prediction and could not count or correspond one-to-one. When the teacher gave small hints, (T: "We matched each pencil with an eraser. There were some leftovers..." D: "İt was more because there were pencils that could not be siblings with an eraser."), the student achieved the correct results by counting and one-to-one correspondence. Tangible activities were reinforced with those on paper.

Figure 9.

The Activity of İdentifying the Group with Less and More.



6. *Conservation of number*: The student was given two groups of beans with different colors in equal numbers. A group of these beans was given collectively and another group dispersedly. The student was asked which group of objects had more. The student stated that the object group that was given dispersedly without counting and one-to-one correspondence of the object groups was more. D: “As if there were more of these. They occupy more space." The student was asked to correspond the bean groups one-to-one. After the teacher's warnings, the student matched the beans one to one and stated that they were equal. Then, the student counted the objects in both groups. Demir replied that "Both beans are 12, so they are both equal". The student was informed that he could match or count one-to-one in order to make him understand which of the object groups was more, less, or equal. However, the student insisted that more objects were scattered when the teacher did not remind the activities carried out during the evaluation phase. Tangible activities were stiffened by revising them on paper.

Figure 10.

The Activity of Understanding the Conservation of Numbers with Representations.

7. Addition and subtraction activities: The student learned the concept that the number increases when counting forward and decreases when counting backward during this process. The student was asked to identify the number of objects. The student counted the objects and said the total number. Later, when the student was asked to add 2 more objects, he added starting from the amount in the total object group instead of adding on it. (For instance; the student counted 5 pencils and said there were 5 pencils, yet he continued to add on 5 since the last number was 5, and he concluded that the result was 6 instead of saying 7 when he added 2 more pencils). The student was encouraged to count the objects without any intervention. The student, who did not face any problems at this phase, was reminded of the concept that each object corresponded to a number and had two numbers added to each other at every turn. The student was finally able to add the numbers. After this process was consolidated with the objects, two groups of object pictures were presented and he was asked to add them to each other. The student counted the number of objects, wrote the counts under them, and added them up. Afterward, the "+" symbol was practiced with the student. The concept of the symbol was presented to the learner, and he was taught that this symbol raises the number in counting and necessitates more counting. At first, the additional activities were conducted with object pictures, and then with the symbols without the object pictures. The operations were carried out successfully by counting first between the numbers 0-9 and then between the first 20 numbers. Later, the concept that the number is reduced in counting down processes was learned by the student. When asked to separate the desired amount from a group of objects, the student first separated the object and counted the remaining one by one. The student was asked a question “How can we do this easily?”, and the student repeated the same method. Afterward, activities for counting the objects as a whole (that is, without making two groups) were carried out. Besides, a countdown activity was performed as much as the desired object group. The student was taught that the last-mentioned amount expressed the number of objects in the group by reminding the cardinal principle of number. İn this way, the student was able to separate the desired amount from a group of objects and said the result. Then, the teacher asked the student to reduce as much as the other picture from a group of objects with pictures. He was able to achieve the correct result. The student was taught that “-” means subtracting and counting down. The number of objects was determined and subtraction was performed on the activity sheet, which did not contain pictures but only symbols. Afterward, operations with no objects but symbols were carried out. The subtraction was performed in the range of 0-10 numbers and then in the range of 0-20 countdowns. While the student was able to add and subtract one-digit numbers with one-digit numbers, as well as two-digit and one-digit numbers, he struggled to add and subtract two-digit numbers with two-digits numbers. This may be because the student performed operations using his fingers. All these tangible stage activities were reinforced with activities using the symbols of numbers.

Figure 11.

Addition Activity Through Pictures.

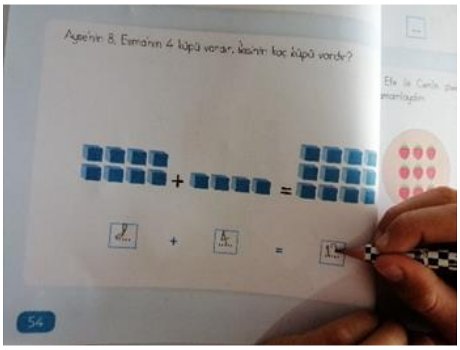


Figure 12.

Counting Activity Through Pictures.

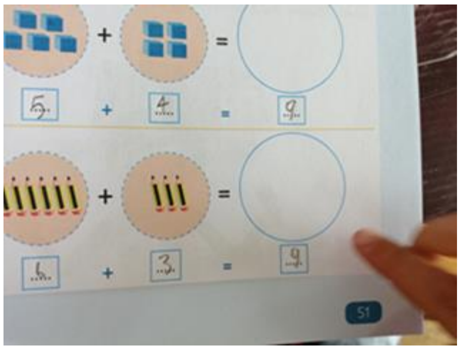


Figure 13.

Reduction Activity Through Pictures.

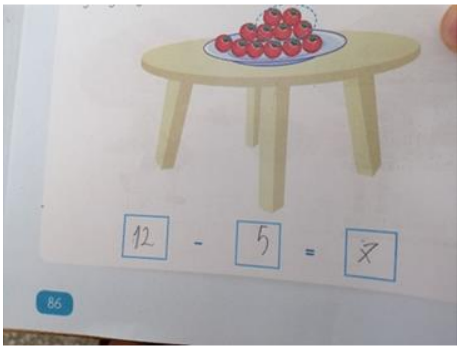
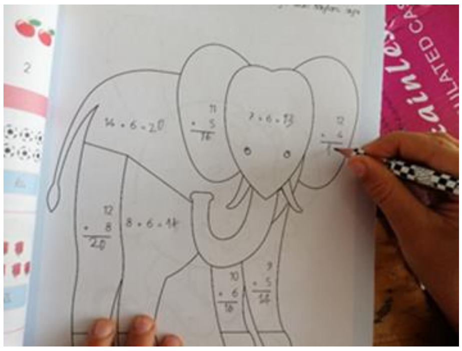


Figure 14.

Operations with Symbols.



Results of the Readiness Test Performed After the İmplementation: This test was prepared for the first-grade students who were still at the literacy stage. The questions of the test were suitable for the teacher to ask the student and note the answer. The results of Demir, who could not respond to any of the pre-application questions of the readiness test, are as follows: The first question of the test, "To what number can the student count by 1?" He was able to count up to 100 in order. The second question, "Can the student count up to 100 by 5s?" The student was able to count by 5s at a time. The third question of the test, "Can the student count up to 100 by 10s?" He was able to answer the question. The fifth question of the test, “Did the student know that 7 scattered and collective objects were equal?”. He did not exactly answer the question. He could guess the correct answer with the teacher’s hint. The sixth question was related to the pictures of animals and fruits, and the student was asked which one was more. The student answered correctly by saying that the number of animals was more. İn the seventh question of the test, the student was asked to correspond the number of objects with the number symbols. The student counted each of the objects and correctly matched them with the numbers. İn the eighth question of the test, the pictures of 10 mice and 7 cheese were given. The question was that “A mouse will eat each slice of cheese. Accordingly, how many mice went hungry?”. The student paired the mice with the cheese without thinking and answered that 3 rats would go hungry. İn the ninth question of the test, 10 numbers were given up to 100. He was asked which number comes in the blank space. The student was able to write the correct answer. The 10th question included 2 groups of mice. There were 10 mice in group 1 and 6 in group 2. “How many mice should be drawn in group 2 so that the number of mice can be equal?”. The student responded “6”. İn the 11th question, 6 soccer balls were given disorganizedly and 6 stars were given in a body. (Stars and balls are equal in size) He was asked which one had more. The student could not reach the desired skill in the conservation of numbers by answering "balls are more". İn question 12, a red bar that did not consist of units was placed on a blue rectangle consisting of 12 unit squares. He was asked, “The red bar is how many blue boxes long?”. Counting the boxes, he found that the length of the red bar was “10 units”.

Discussion, Result, and Recommendations

This study was conducted with the first-grade primary school student who was behind his peers academically and socially. Demir, who had a low level of social and academic readiness, did not possess any skills in the mathematics course except for counting up to 10. At the end of the 25-hour study, he was observed to gain the skills such as rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, which are the necessary skills for mathematics readiness, and adding and subtracting numbers up to 20 as well as expressing numbers up to 20 with symbols; whereas, he gave incorrect answers regarding the conservation of number without taking any hint.

Under the strength of the observations made during and before the study, as well as the readiness test applications, it is thought that the level of readiness must be one of the most significant aspects determining the student's learning. One of the most crucial reasons why Demir was behind his peers was determined as his low readiness. Kocyigit (2009) grouped readiness under five categories within the framework of teachers' and parents’ views. These are; physical skills and general health status, social-emotional skills, mental skills, self-care skills, and biological age. İn their study, Sahin and Guzel (2018) compared the average scores of the older and younger age group students in terms of numbers compared to the 69 months age group, and they found a significant difference in favor of the older age group with high readiness. Avci (2015) concluded that those receiving pre-school education had higher mathematics skill scores. Having analyzed the first-grade primary school students’ knowledge about numbers, Olkun, Yesilpinar, and Kisla (2014) noted that knowledge and skills with counting develop depending on age and pre-school education status. Keeping all these results in reserve, the biggest reason for Demir's readiness to fall behind all his peers’ was that he was not in an educational process through family or school during the pre-school period.

Demir did not receive pre-school education from family or school in the cognitive and social sense of being ready for school before starting school. Various results outlined that students who did not receive preschool education compared to their peers experienced more cognitive, social, and emotional difficulties (Uzun & Alat, 2014). According to Alptekin (2015), math teaching is a lesson in which previous information is a prerequisite for the next during the learning process, which ranges from easy to challenging. Therefore, being disciplined and systematic are remarkable for ensuring permanence. İt is argued that the acquisitions of the previous class should be achieved in order to move on to the next education level (Olkun & Toluk- Ucar, 2007; Van de Walle, Karp, & Bay-Williams, 2012). This process was treated from concrete to abstract, firstly rhythmic counting, then meaningful counting, one-to-one correspondence, conservation of number, and minority-multiplicity comparisons were made and the learning objective of the previous principle was used. The instruction included the order of objects, pictures, representations, and abstract symbols.

The level of readiness and the cumulative progress of mathematics are considered key steps for further learning. Grouping, classification, and sequencing skills, a basis for learning numbers in mathematics lessons along with math readiness skills such as rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons and conservation of number and one-to-one counting, stable-one order, cardinal principle, abstraction, and order-irrelevance principles known as counting principles are significant for readiness and teaching more complex skills in mathematics lesson (Olkun & Toluk-Ucar, 2007; Baykul, 2016; Gelman & Gallistel, 1986). İn order for the student to be ready for the concept of numbers, rhythmic counting, meaningful counting, one-to-one correspondence, minority-multiplicity comparisons, and conservation of number skills should be considered both among each other and as a whole with the counting principles for natural numbers readiness, and teaching them in an integrated way may contribute more to the learning process. Alptekin (2015) emphasized that great importance should be attached to counting skills in order to ensure number acquisition. Just as in this study, the student can achieve some of the readiness stages or he or she may have difficulties in others. Olkun, Celik, and Sonmez (2017) implied that students had difficulty in meaningful counting even though they knew the counting skill by rote and that some of the children had difficulty in acquiring the cardinal principle of counting even though they gained the order-irrelevance principle of counting, which is parallel to the results of this study.

Referencing the classification, sorting, and comparison stages, the significant skills for numbers, and one-to-one correspondence in this study, İnan and Erkus (2019) put forward that the concept of one-to-one correspondence for 3 years old and over greatly improved, 5- 6-year-old group improved 100% in terms of one-to-one correspondence skills, the classification skill used in the study develops from the age of 4, the concept of comparison develops to a large extent from the age of 3, the concept of sorting develops with the age of 5-6. These results show the acquisition of these concepts in pre-school and the significance of the education received in the pre-school period in terms of readiness for numbers. As is seen in the plan prepared for Demir in our study, it may be wise to mention that teaching mathematics courses as a whole in a complementary way will make a major contribution to the child's holistic mathematics development in the following processes.

During the counting procedure, numerous things were counted in order to keep Demir alert during the instructional process. Demir was observed to show more interest in the process and learned by having fun with the addition of songs to the enriched activities. In particular, the teaching process was carried out in an empty classroom, which prevented the student's distraction. Likewise, Koc and Korkmaz (2019) taught mathematics to an illiterate third-grade student with dyscalculia and concluded that students with dyscalculia caught up with normal students thanks to sufficient time, individual instruction, and enriched instruction. The student was given feedback while producing each number, especially at the point of the production of symbols, and he was provided to rewrite the number. This contributed to the correction of the student's erroneous learning. Similarly, in the action research conducted by Akyol and Ozdemir (2018), correcting the writing disorder by following the student gradually, and the individual practices and interest shown by the teacher contributed greatly to overcome the student's deficiencies.

This study includes some limitations, the biggest of which was to conduct the study with a single student. The instruction was carried out by developing an action plan in line with the needs of the student. The effects of this application carried out with larger groups are shadowy. The study took place in a region with a low socioeconomic status. It is ambiguous what the effects of the study will be when conducted in a different region and environment.

❖ Readiness level is of utmost importance for students to learn many subjects before starting primary school and during the educational process. Parents who are aware of and accept this circumstance can make the appropriate arrangements. As a result, parents might be made aware of their responsibilities.
❖ The students' readiness should be endorsed in the pre-school period by exposing them to as many stimuli as possible for their mathematical development.
❖ Action research may be conducted to develop students' four operation skills, which are the basis of mathematics, in order to avoid learning loss, especially in larger classes. These studies may be carried out specifically for teaching 4 operations with different methods and techniques.

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Student Clubs at Universities: A Content Analysis on Diversity

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Abstract: Student clubs at universities are quite significant in acquiring many skills and competencies, especially personal, cognitive, and social development, to support students' professional and academic achievements. That being the case, this paper, a descriptive case study, aims to unveil how student clubs in Turkish state universities are diversified according to their fields of operation and university types. As of January-February 2020, 207 state and foundation universities exist in Turkey, and 11.106 student clubs information on 175 websites of these universities was attained for this research. Student clubs in the study were analysed in terms of the access information of the clubs and the number of university students. In contrast, club names were coded using the content analysis method. As a result of the analyses, it was observed that these clubs are classified under three themes, eight categories, and nineteen codes. At the end of the study, it was concluded that access to information of student clubs at Turkish universities and their visibility levels on universities' websites and other social media are rather insufficient, and some suggestions were therefore made.

Keywords: University, student clubs, content analysis.

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Introduction

Today's higher education institutions are influenced by the modifications induced by global economic, political, and social developments. They are rather focused on using information as third (Wissema, 2009) and fourth (Lukovics & Zuti, 2015) generation institutions. Therefore a university understanding that is oriented with entrepreneurial and innovative collaborations (Etzkowitz & Leydesdorff, 2000) is accepted as a success model since the early 2000s. Alongside the missions of universities such as education, research, and social service, their most critical roles have been their contributions to the development of their countries.

This has not only made the universities research oriented (Froumin, 2011) in a proactive position for local economies (Lukovics & Zuti, 2013) but also elevated them to a global platform with international collaborations (Salmi, 2011). At this platform, results such as the ranking of universities by ranking agencies, subjecting them to quality and accreditation processes by internal and external evaluation institutions, cooperation activities with the industry and other stakeholders, and finally bringing the research mission to the forefront have become inevitable and, in the most general terms, the names of all these prescriptions are framed by the motto 'world-class university' (Altbach, 2011).

Digitalisation, the most important change adventure for information and communication globally, has influenced universities in all socio-economic structures and systems. Moreover, beyond a technology-driven transformation in higher education, a process of change has been initiated in which education, research, and social services are provided in line with the demands of users/beneficiaries. These beneficiaries capitalise on services in a changing competitive environment where new working models are created (Seres et al., 2018).

The main common points of the two principal factors, internationalisation and digitalisation in higher education, was that they developed solutions based on a more collaborative and distinctive/individualised researcher and student profile. Although containing an abstruse paradox, it is undeniable that the most critical indicator of a successful university today is the qualified students/graduates and many other factors typifying a university. What makes this indicator a deal is the university's obligation to respond to the demands of the sector based on the changes mentioned above, labour demand, and knowledge economy (Gallagher, 2011). Thus, as the ability to work professionally or career success/preferability is envisioned as a university's success, universities have started to regard their students as their most important stakeholders (Sears & Hall, 2000).

Students are regarded as mattering stakeholders signals that they are seen as external stakeholders who attend the university for education and internal stakeholders who are influenced and ultimately become influencers through this process inside. According to Burrows' 'multiple lenses' theory (Avci et al., 2015) regarding the application of stakeholder theories that have a business management approach to higher education institutions; students, despite regarded as external stakeholders in terms of their 'enrollment' potentials to higher education institutions, are rather significant internal stakeholders since they are in the focus of academic and scientific activities when they start their educations. In this sense, according to the 'threat- cooperation' classification about the stakeholders, students are in the 'low threat-high cooperation' axis as the stakeholders of higher education institutions necessitating establishing the relationship with students on the 'involvement strategy' (Burrows, 1999).

According to the distinction of power, legitimacy, and urgency, based on the theory of stakeholder analysts by Mitchell et al. (1997); the stakeholder was defined primarily, and dynamism was brought to the salience of stakeholders theory according to the differentiation of the features made (Mitchell et al., 1997): (1) Attributes of stakeholders are variable, not fixed. (2) Attributes of stakeholders are built socially, not objectively. (3) There may be conscious and deliberate practices in stakeholder behaviours etc.

In this sense, students are in the position of being legal/legitimate and inevitable stakeholders. Therefore, students are directly dependent on institutional interests, which require them to be qualified as legitimate stakeholders in the institution's legitimacy. On the other hand, benefits that are expected from students (such as their graduation and future career) cause students to be transferred into the position of being inevitable and determinant for themselves and higher education institutions (Mitchell et al., 1997). This also signifies that students are regarded as significant stakeholders in higher education institutions in the sense of decision making, institutional life, multiple cultures, and their relationships with each other and the environment (Bergan, 2004).

The stakeholder approach (Bjorkquist, 2008), emerging from universities operating in isolation from socio-economic and political developments for many years, has entered into social relations (external relations) in the last century and has prompted universities to depend on an internal assessment. At this very point, students have become stakeholders with key roles in the centre of internal assessments. In many universities' strategic plans, students are defined as influenced by and affecting the institution in the stakeholder category (Hostut, 2018). Besides, students are seen as the key components of the knowledge society within the academic mobility of the universities nowadays (Sehoole & Lee, 2020). Student clubs are also classified as one of the most important stakeholders in the stakeholder analysis of some universities (Hostut, 2018).

Although various applications of these developments can be stumbled upon in education and research, universities' collaboration with students in all operations is rapidly becoming widespread due to their mission to serve the society, e.g. placing students into the centre as a requirement of social service (including them in decision-making mechanisms) and evaluation of students. This firstly stands for individual 'involvement' of students in the course of their higher education (Astin, 1984; Cooper et al., 1994; Terenzini et al., 1996) and secondly 'participation' in intra- institutional/

organisational decisions and 'being involved in the decision-making process' (Lizzio & Wilson, 2009; Menon, 2003; Zuo & Ratsoy, 1999).

Universities have become student-centred due to students' involvement in the management/governance practice (Johnson, 1991; Richter & Tjosvold, 1980). Students are the stakeholders in an individual or social sense (Jongbloed et al., 2008) and are the most affected by the institutions' decisions. The most well-known practice of student-centeredness in universities has emerged in "student club"* organisations.

It was stated that student clubs contributing to embodiment and institutionalisation of student participation have numerous socio-psychological/psycho-social benefits (Cooper et al., 1994) primarily in students' cognitive advancement (Terenzini et al., 1996), 'educational involvement/engagement', 'class participation', 'career planning', 'lifestyle planning', 'cultural and social participation', and 'academic autonomy'. Student clubs, in which the participation is defined as "physical and psychological energy that students distinguish as academic experiences" (Astin, 1984), become concrete, reinforces academic learning through student peer interaction, and contributes to the transformation of university campuses into social areas where philosophical and political thoughts related to campus activities, personal/social problems, and agendas in arts, science, technology or international relations are discussed (Schlossberg, 1989). Furthermore, this enables students to feel important and positively reflect on their universities' loyalty relations (Pascarella & Terenzini, 2005).

Student clubs are important in terms of 'retention', the students' commitment to universities, as 'personal integration & adjustment' also plays a key role in the social fabric of campus/university life as well as the effect of academic factors in getting used to university life (Gerdes & Mallinckrodt, 1994). There are studies in the literature (Ewing et al., 2009; Foreman & Retallick, 2013; Webber et al., 2013) suggesting that when university students are engaged in the social aspects of campus life, that is, when they actively participate in student clubs, they are more capable of redounding their learning and personal development and academic achievement (Huang & Chang, 2004). It is also stated that leadership tasks in these clubs contribute to their careers, academic achievements, and the development of a certain set of social skills (Logue et al., 2005). Similarly, it is asserted that the participation of students in professional organisations grants them skills such as leadership, teamwork, trust, and time management (Phillips et al., 2015).

These and many similar positive contributions of student clubs have even been used in learning processes with the name 'service-learning' as a pedagogical method such as 'experiential education', 'problem-based learning', and 'collaborative learning'.

* In the Turkish higher education system, student organisations use the terms 'student society/community' and 'student club' in regards to student organisations. In this study, in terms of concept unity and increasing usage rate, the term 'student club' was preferred.

Service-learning, which refers to the use of participation in student clubs as a pedagogical method for teaching lessons, includes the following functions of student participation (Chi, 2000; Jones & Abes, 2004; Pascarella & Terenzini, 2005; Smith, 1994): (1) Students' 'commitment' to social movements and political systems, (2) Participation of students in social services in terms of helping others, understanding problems of the society, and working in volunteer jobs that will contribute to increasing their 'other-oriented' attitudes in the future, (3) Perception of social and economic inequalities, (4) The tendency to attribute these inequalities to the system, not to individuals, and (5) A sense of social responsibility.

In the literature, discussions about the reasons for student clubs' participation in community activities regarding their contribution to students' psychological, social and socio-economic achievements and what kind of gains these clubs have gained also have a significant place. Regarding these issues, the artistic, sportive, and academic clubs (Dugan, 2013), which students regard as a means of identity and expression, promote academic achievements in students (Pascarella & Terenzini, 2005). These clubs also provide individual, social, and civic awareness developments (Dugan & Komives, 2007).

In essence, it is observed that student clubs that contribute to the understanding of "participatory culture" in institutional and structural terms also contribute to education and research activities regarding "socialisation", "harmony", "efficiency", and "human/universal/intellectual achievements" indirectly on young people. For this reason, it becomes inevitable that student clubs are considered as structures that can offer clues in developing solutions as a complement to the student-centred/participatory education-teaching suggestions for the quality problems that arise with the globalisation and massification process of universities. In this sense, studying matters through more cases such as "how and what types of clubs students come into operation" and "what kind of outcomes they gain and what they expect from these clubs" is of great importance regarding student satisfaction and universities' basic missions.

In this context, the purpose of this study is to determine which areas student clubs at universities in Turkey focus on (resemble each other) and how they vary (diversify) at universities. Therefore the following questions were sought:

1. How are student clubs at Turkish universities distributed according to university types?
2. How do student clubs at Turkish universities vary according to their names and fields of activity?

Method

Research Designe

This study was designed by using the 'case study' model to show the distribution of fields of activity over the names of student clubs in Turkish universities. A case study is used to view a situation or phenomenon in its real-life context by applying many data types (Cohen et al., 2007). According to Yildirim and Simsek (2008), the case study ensures the analysing of one or more cases holistically within its limits (environment, time, etc.). According to Creswell (2007), a case study is a qualitative study that examines in-depth and describes situations and situational themes. In this paper, a case study pattern was used as the aim was to circumscribe the distribution (frequencies) of student clubs at Turkish universities according to their fields of activity and their differences in universities.

Study Group

All of the 'target population' (Turkish universities) are included in the study to keep track of the entire (targeted) group. As creating generalisable judgments about the target universe as much as possible in a study is aimed, the target becomes the universe that the researcher intends to examine, be interested in, determine, and generalise the results (McMillan, 1996). Since this study aims to reach student clubs in all Turkish universities, there is no set study group.

In the study, the databases of the Council of Higher Education (YOK), a "supreme institution that regulates the higher education system in the country and directs the operations of higher education institutions", were used to reach the current number and information of Turkish universities (YOK, 2020). Between December 2019 and January 2020, when the study was carried out, there were 207 universities in Turkey, 129 of which were 'state/public' and 78 foundation/private universities. As 5 of 78 foundation universities are merely vocational schools, they will be referred to as foundation-vocational schools. In this study, student clubs in these foundation-vocational schools were also examined.

Data Collection Tool

Document analysis method was used in the process of collecting data in the study. Document analysis is a method that is employed for analysing qualitative research to analyse written or visual documents, to make inferences and interpret those (Corbin & Strauss, 2008). Websites of 207 Turkish universities were used to collect data. Data were obtained over 5-10 days to be least affected by changes from the establishment and/or closure of new student clubs. A separate filing system was applied to make comparisons between state and foundation universities. The data on student clubs were entered in an Excel file alphabetically for assessment and systematisation (Coffey & Atkinson, 1996).

Additionally, to make a comparative analysis in the file, the link location/menu title information on universities' websites, the basic promotion elements, and the total number of students at the universities were also included.

Data Collection and Analysis

Data collection was carried out between December 2019 and January 2020. Because there was no information on student clubs on the websites of 15 states, 16 foundation universities, and 1 foundation vocational school, data of those could not be acquired. However, information on 11,106 student clubs of 175 universities (85% of Turkey), 2,714 of which belong to 61 foundation and 8,392 to 114 state universities, were reached.

The content analysis method was used to determine the status of activity fields according to the names of student clubs. There are four stages in the content analysis: coding data, finding themes/categories, editing codes and themes/categories, and interpreting the findings (Yildirim & Simsek, 2008). In this study, the student clubs were coded according to their names. For those clubs (433 in the last coding), activities that cannot be found/deduced by their name, the university's social media accounts (if any), and/or their websites were tried to be used. Information about the clubs was expected to be obtained. Other clubs with similar names in other universities are taken as criteria, and coding is done accordingly for the clubs whose information was not available. After this stage, codes, categories, and themes were rechecked with the help of a colleague. Those who have different coding from student clubs under the same name are combined under a single code. As a result, student clubs are classified under three themes, eight categories, and nineteen codes. After certain revisions, the codes were digitised, and the findings obtained were interpreted. Voyant Tools and Excell programs were used in word and data analysis. Voyant Tools is a web-based application that uses more than twenty visualisation tools to analyse text (Cortés-Sánchez, 2017).

Validity and Reliability

In the study, the researcher triangulation technique (Denzin, 1970, as cited in Fusch et al., 2018) was used for internal validity. In collecting and analysing data (at the stage of determining the activity fields by name), contributions of two different specialist academics were received. Data collection and analysis were elaborated for external validity, and a systematic way was followed in all processes. Also, direct sample transfer of information obtained from secondary sources (university web pages) was included.

In the study, the formula of consensus similarity ($\Delta = C \div (C + \partial) \times 100$) of Miles and Huberman (1994) was taken as the basis for internal reliability. In this formula, Δ: is reliability, C: is the number of agreements, ∂: is the number of disagreements. In the first coding on the same output, 73% consensus (except the clubs, which cannot be inferred about the field of activity by name) was acquired. Different encodings were retained first, and the final decision regarding the field of activity of the club was reached by considering a third researcher's opinion to ensure consensus. As a second method, if the club had detailed information on the internet, it was reached, and the inference was made for coding and category from its operations. In the second coding, the consensus rate was elevated to 84%. Eight clubs whose names could not be inferred from their activity fields and no detailed information could not be coded in any category. Instead, they were qualified under the code "entertainment and socialisation" based on the assumption that the most general purpose of all clubs is "socialisation". For the study's external reliability, the coding notes about the data were stored as prints and computer files.

Findings

The findings obtained in the study were analysed under two main parts. In the first part, qualitative information about student clubs was given, while in the second part, the clubs were classified per university types and their fields of activity. In the study, firstly, an evaluation was made regarding the availability of necessary information about student clubs accessed from universities' websites, the place of access on the website, and the frequency of words. Descriptive information about the state universities is given in Table 1 below.

Table 1.

Descriptive Information on Student Clubs at Turkish State and Foundation Universities

	State Universities		Foundation Universities	
Indicators	**Content**	**Number**	**Content**	**Number**
Information	Detailed info	102	Detailed info	53
	No detailed info	12	No detailed info	8
	No info	15	No info	17
Place on the net	Administrative menu	60	Administrative menu	10
	Separate menu	54	Separate menu	51
	No data	15	No data	17
Most repeated words	Young	538	Young	83
	Culture	250	Social	74
	Thought	247	Thought	59
	Turkish	241	Theatre	54
	Social	199	Turkish	54
Least repeated words	Research	50	Uni (abbreviation)	19
	Society	51	Responsibility	19
	Woman	51	Archery	19
	Tourism	52	Media	19
	Information	52	Public	19

Note: Voyant Tools and Excell programs were used in word and data analysis.

According to Table 1 above, 102 (79%) of state universities and 53 (68%) of foundation universities show promotional information on basic topics such as student club's contact address, chairman, advisor, and purpose. Of these examples, the *statistical analysis* of Afyon Kocatepe and Akdeniz Universities on the activities of student clubs, Karamanoglu Mehmet Bey University's *activity ratings*, Pamukkale University's *information system portal*, and Middle East University's *video introductions* can be given as different examples in terms of their aims, activities, and visibility. On the other hand, recently established state universities such as Ankara Haci Bayram, Ankara Social Sciences, and Erzurum Technical University, and deep-rooted universities such as Bursa Uludag, Dicle, and Firat Universities can be shown as examples for universities that do not have detailed information about student clubs on their websites (The homepages of those universities were rechecked on February 15th, 2020).

Secondly, an evaluation was made on the menu title of the state and foundation universities' websites. According to the table, almost half of the state universities (n=60) and very few of the foundation universities (n=10) have information about student clubs under the menu 'Administrative Structure' belonging to the Department of Health, Sports, and Cultural Activities that conducts its operations and is responsible for student clubs as the head of the department directed by the Rectorate. However, it is seen that the other half of the state universities (n=54) and a large part of the foundation universities (n=51) employ easily accessible student club information through the menu titles such as "student, candidate student, and life on campus". Examples such as *Student Deanship* at Istanbul Okan University, *Advisory Rectorship for Student Clubs* at Gazi University, the *Student Club Management Unit* at Kahramanmaras Sutcu Imam University and the *Student Club Coordinatorship* at Selcuk University can be given as different examples in terms of the weight of the subject.

On the other hand, as can be seen in Table 1 above, the most frequently repeated words in the student club names of state universities were; *young (n=538), culture (n=250), thought (n=247), Turkish (n=241), and social (n=199)*; while they were *young (n=83), social (n=74), thought (n=59), theatre (n=54), and Turkish (n=54)* in foundation universities. In terms of quantitative assessment about student clubs, the number of student clubs and students on campus was comparatively analysed according to the types of universities. Thus, in Tables 2, 3, 4, and 5, information about 10 Turkish universities with the highest and least student clubs is given.

As shown in Table 2 above, it was found that Istanbul University has the highest number of student clubs (n=223) among the Turkish state universities. It is Turkey's first university (whose foundation dates back to the period of the Ottoman Empire). Marmara, Bursa Uludag, Hacettepe, Sivas, Dicle, and Erciyes universities, which are amongst the top ten and have the highest number of student clubs, can be held up as examples to other state universities. Another important finding in Table 2 is that the average number of clubs per student is as low as 0.30%, due to many students in state universities, generally over 50,000.

Table 2.

10 Turkish State Universities with the Highest Number of Student Clubs

University Name	The Number of Student Clubs (A)	The Number of Students (B)	The Number of Student Clubs per Student (%) (A/B)
Istanbul	223	85,620	0.26
Marmara	197	77,492	0.25
Sakarya	180	54,517	0.33
Bursa Uludag	176	70,607	0.24
Canakkale Onsekiz Mart	158	47,219	0.33
Pamukkale	154	54,556	0.28
Hacettepe	151	52,007	0.29
Sivas Cumhuriyet	148	51,751	0.28
Dicle	145	29,466	0.49
Erciyes	142	50,283	0.28

Note: The number of students in the universities is of the 2018-2019 academic year data obtained from the Higher Education Council website statistics (Access Date: February 10th, 2020).

Table 3 below provides information on 10 Turkish state universities with the least number of student clubs.

Table 3.

10 Turkish State Universities with the Least Number of Student Clubs

University Name	The Number of Student Clubs (A)	The Number of Students (B)	The Number of Student Clubs per Student (%) (A/B)
Ardahan	10	5,017	0.19
Tarsus	11	2,458	0.44
Ankara Social Sciences	12	1,070	0.33
Eskisehir Technical	12	14,320	0.08
Erzurum Technical	14	4,132	0.33
İzmir Bakircay	14	831	0.33
Mimar Sinan	14	10,886	0.12
Sakarya University of Applied Sciences	14	23,424	0.05
Batman	16	12,203	0.13
Trabzon	19	13,255	0.14

Note: The number of students in the universities is of the 2018-2019 academic year data obtained from the Higher Education Council website statistics (Access Date: February 10th, 2020).

As shown in Table 3 above, Ardahan University (n=10) has the least number of student clubs among the state universities. It is also seen that the universities on the list are mostly newly established state universities, except for Mimar Sinan University, which is a boutique and an old one. On the other hand, in state universities with a small number of student clubs, the number of clubs per student was as low as 0.20% on average. Table 4 below shows 10 foundation universities with the highest number of student clubs.

Table 4.

10 Turkish Foundation Universities with the Highest Number of Student Clubs

University Name	The Number of Student Clubs (A)	The Number of Students (B)	The Number of Student Clubs per Student (%) (A/B)
Baskent	120	16,728	0.71
I. D. Bilkent	110	12,185	0.90
Istanbul Medipol	97	30,616	0.31
Istanbul Bilgi	92	25,624	0.35
Istanbul Kultur	86	15,697	0.54
Uskudar	79	18,983	0.41
Istanbul Okan	76	22,586	0.33
Cankaya	73	8,148	0.89
Istinye	72	5,448	1.32
TOBB University of Economics and Technology	70	6,052	1.15

Note: The number of students in the universities is of the 2018-2019 academic year data obtained from the Higher Education Council website statistics (Access Date: February 10th, 2020).

According to Table 4 above, the foundation university with the highest student clubs is Baskent University (n=120). It can be stated that the other universities on the list are also relatively old, such as I. D. Bilkent, Istanbul Bilgi, Istanbul Okan, and TOBB University of Economics and Technology. It was discovered that the number of clubs per student is averagely above state universities (0.70%) since the number of students of foundation universities is lower. The information of universities with the least number of student clubs among foundation universities is given in Table 5 below.

Table 5.

10 Turkish Foundation Universities with the Least Number of Student Clubs

University Name	The Number of Student Clubs (A)	The Number of Students (B)	The Number of Student Clubs per Student (%) (A/B)
Alanya HEP	5	421	1.18
Yuksek Ihtisas	7	820	0.85
Atasehir Adiguzel	9	1,361	0.66
Ibn Haldun	11	978	1.12
Avrasya	12	6,883	0.33
Avrupa	13	2,092	0.17
Hasan Kalyoncu	16	7,931	0.20
Istanbul Gelisim	17	23,739	0.07
Cappadocia	18	4,448	0.40
Piri Reis	19	3,836	0.49

Note: The number of students in the universities is of the 2018-2019 academic year data obtained from the Higher Education Council website statistics (Access Date: February 10th, 2020).

It can be observed in Table 5 above that the university with the least number of student clubs among the foundation universities is Alanya HEP University (n=5) and that most of the other universities are newly established ones. Thus, the number of clubs per student on the list is 0.55%.

The main three missions of universities are used as themes in the analysis. While determining the categories related to the themes, classifications were made based on these missions. The most notable benefit of extracurricular activities and student clubs (factors such as the acquisition of certain social-cognitive skills and identity/personality development, which will also contribute to students' careers and academic achievements) are shown (Foubert & Grainger, 2006; Gellin, 2003; Guardia & Evans, 2008; Logue et al., 2005). These factors are also associated with the competencies acquired by students in terms of education, research culture, and social work throughout their higher education (Star & Hammer, 2008).

As shown in Tables 6, 7, and 8 below, student clubs of 175 universities, whose data were obtained within the scope of the study, are classified under eight categories and nineteen codes. Categories include "developing research culture", "increasing scientific knowledge competence", "professional and academic solidarity", "cognitive and psychosocial development", "social responsibility and consciousness", "health and sports", "culture and art", and "activity together".

Table 6.

Turkish State and Foundation Universities, Student Club Categories and Codes (According to research theme)

Classification		State	Foundation	Total
Category	Code	(n)	(n)	(n)
1. Developing research culture (n=132)	R&D - Project studies	75	17	92
	Innovation	29	11	40
2. Increasing scientific knowledge competence (n=394)	Science, informatics, and technology	173	32	205
	Digitalisation	102	34	136
	Aviation and space	47	6	53
			Research Theme Total	526

According to Table 6 above, it is seen that student clubs are mostly grouped as "science, informatics and technology" code under the category of "increasing scientific knowledge competence" (n=394) and "digitisation" code (n=136) within the category of "science, informatics and technology" (n=205). From state universities, student clubs such as *Computer Society Club, Technology Transfer Club, Alternative Energy Systems Club, Educational Technology Club,* and *Science Women Club,* and from foundation universities; *Electric Vehicles Club, Science Power Plant Club, Software Development Club, Informatics and Information Technology Club,* and *Science Office Club* can be given as examples for information, informatics, and technology category. On digitalisation state universities following clubs stand out: *Robotic Application and Development Club, Artificial Intelligence and Image Processing Club, Cyber Security Club, Autonomous Systems Club,* and *Solar Car Team,* and from foundation universities:

Unmanned Vehicle Club, Nanoscience Club, Smart Cities Student Club, Personal Data Protection Club, and *Maker Club.* Table 7 below shows the categories and codes under the education theme, where the majority of the student clubs take place.

Table 7.

Turkish State and Foundation Universities, Student Club Categories and Codes (According to education theme)

Classification Category	Code	State (n)	Foundation (n)	Total (n)
3. Professional and academic solidarity (n=4,672)	Occupation and department association	2,232	872	3,104
	Academic, business and technical field partnership	1,048	209	1,257
	Career development and entrepreneurship/leadership	235	76	311
4. Cognitive and psycho-social development (n=1,268)	Thought, discussion, and common identity	885	226	1,111
	Personal development and hobby	99	58	157
			Education Theme Total	**5,940**

According to Table 7 above, it appears that student clubs are most commonly classified over the "profession and department association" code (n=3,104) and "academic, business, and technical field partnership" code (n=1,257) under the category of "professional and academic solidarity" (n=4,672). Another category in which student clubs are most coded is "cognitive and psychosocial development" (n=1,268); within this category, there are student clubs under the codes of "thought, discussion, and common identity" (n=1,111). Related to profession and department/program association; *Common Point - Mathematics Club, Turkish Medical Students International Committee (TURKMSIC), Young Lawyers Club, Engineering Society of Eskisehir (ESOES), Engineer Brain Club,* and *Guiders to Goals (G2G) Club* can be examples of state universities. In contrast, *Teeth and Stuff Club, Rainbow Child Development Club, IEEE Student Branch, European Medical Students Association Club (EMSA), Ergotherapy Club,* and *Red Helmet Club* are those of foundation universities. Regarding the academic, business, and technical field partnership; *Migration and Middle East Club, Strategic Research Club, Academic Development and Science Club, Mulkiye History Club,* and *University-Industry Cooperation Club* can be examples for state universities, and *Librarianship Club, Urban Studies Club, Turkish World Studies Club, Rare Diseases Club,* and *Translation Club* for foundation universities. On the other hand, concerning thought, discussion, and common identity; state universities' club examples can be *Ataturkist Ideology Club, Socialist Thought Club, Utopia Club, Idea Workshop Club, Debate Club,* and *Model United Nations Club (MUN)*, and for foundation universities; *Youth Ideas Club, Social Democracy Club, International Debating Club, TEDx,* and *Anatolian Youth Club.* Table 8 below shows the categories and codes under the social service theme of student clubs.

Table 8.

Turkish State and Foundation Universities, Student Clubs' Categories and Codes (According to social service theme)

Classification Category	Code	State (n)	Foundation (n)	Total (n)
5. Social responsibility and consciousness (n=1,389)	Contribution to the natural and cultural environment	241	67	308
	Community health and solidarity	582	149	731
	Positive discrimination and awareness	255	95	350
6. Health and sports (n=1,209)	Health development and problems	107	20	127
	Sportive activities and organisations	793	289	1,082
7. Culture and art (n=1,382)	Cultural differences and activities	240	37	277
	Artistic formations and activities	783	322	1,105
8. Activity together (n=660)	Fraternity and homogeneous group memberships	347	156	503
	Entertainment and socialisation	119	38	157
			Social Service Theme Total	4,640

According to Table 8 above, student clubs are mostly clustered under the following categories: "community health and solidarity" code (n=731) within the "social responsibility and consciousness" category (n=1,389), "artistic formations and activities" code (n=1,105) within the "culture and art" category (n=1,382), "sportive activities and organisations" code (n=1,082) within the "health and sport" category (n=1,209) and "fraternity and homogeneous group works" code (n=504) within the "activity together" (n=660) category. Regarding community health and solidarity, examples of student clubs from state universities are; *Children with Leukemia Foundation (LOSEV) Club, Young Red Crescent, Young Green Crescent, Young-Earth Doctors Mediterranean Club,* and *Hand-in-Hand for Life Club,* and for foundation universities: *Buddy Club, Village Schools Aid Club, Fight against Cigarette Club, Search and Rescue (AKUT) Student Club,* and *Young Volunteer Club*. Concerning artistic formations and activities, examples of student clubs from state universities are as such: *Baglama and Anatolian Music Club, Literature for Us Club, Amateur Photographers Club, Just us Theatre Club,* and *Pas De Deux Dance Club*, and for foundation universities: *Classical Turkish Music Club, Mehmet Akif Literature Club, Modern Dance Arts and Folk-Dance Club, Amateur Authors Club,* and *Magical Lantern Cinema Club*. Regarding sportive activities and organisations; *Travel and Camping Club, Amateur Sports Club, Electronic Sports Club, Women's Flag Football,* and *Free Bicycle Club* serve as examples for state universities, whereas, *Extreme and Outdoor Sports Club, Underwater Sports Club, Chess Club, Traditional Turkish Archery Club,* and *Amateur and Sportive Aviation Club* are the examples for foundation universities. Finally, for fraternity and homogeneous group works, examples from state universities are *Azerbaijan-Turkey Brotherhood Club, Syrian Youth Cultural Society, the Turkish world and Relatives Club, Turkmen Student Club,* and *the African Students Club*, and for foundation universities, examples are; *International Student Club, the Erasmus Student Network Club, Uni BJK, Uni Young FB,* and *Uni Ultraslan.*

Discussion and Conclusion

This study aims to illustrate the distribution of student clubs in Turkish universities according to university types and names. It was witnessed that there were more student clubs in state universities than in foundation universities and universities with old establishment dates compared to new ones. This finding obtained from the study coincides with Mohan Bursali and Aksel (2016)'s study that there are over 100 student clubs in one of Turkey's 30 oldest state universities (established in 1992). Besides, Turan et al. (2017) state that 70 student clubs in a state university were established in 2006. This situation coincides with the finding that the number of student clubs is high in state universities despite being newly founded. However, it can be maintained that the number of clubs per student is not relatively high due to the high number of students in state universities. As a matter of fact, in line with this finding, Yaldir, Koyuncuoglu, & Demir (2016) developed a student club management information system application for simplifying the processes of participation in student clubs. The finding of the low number of student communities per student obtained from this study is in line with the suggestion in Eskici and Aktas (2014)'s study that students' interest in clubs should be increased and student communities should be made more active and efficient. Besides, it was ascertained that basic information, especially contact information about student clubs on the universities' internet homepages, is mostly included. The examples of Hacettepe, Gazi, Marmara, Akdeniz, Erzincan Binali Yildirim, and Afyon Kocatepe Universities discerned that certain universities have relatively more statistical and visual elements and practices that can set models for other universities. Finally, it can be affirmed that student club details are more accessible on the homepages of foundation universities than state universities; they both are not sufficient in terms of the visibility of the clubs.

In the study, student clubs are grouped into eight categories due to the analyses performed on the names. Student clubs in these categories are as follows per their numbers: a) Professional and academic solidarity, b) Social responsibility and consciousness, c) Culture and art, d) Cognitive and psychosocial development, e) Health and sport, f) Activity together g) Increasing scientific knowledge competence, and h) Developing research culture. Amongst the categories, it is seen that student clubs are distributed mostly and relatively as: "Occupation and department association", "academic, business, and technical field partnership", "thought, discussion, and common identity", "artistic formations and activities", "sportive activities and organisations", "community health and solidarity", "fraternity and homogeneous group memberships", "positive discrimination and awareness", and "career development and entrepreneurship/leadership".

The study unearthed that student clubs mostly diversified under profession and department/program names (category). Secondly, it was observed that student clubs are diversified in academic research, work (profession), and technical issues. On the other hand, it was concluded that there are many student clubs in Turkish universities operating on similar thoughts, ideologies, and/or discussion environments. This finding coincides with Dugan's (2013) 'latent' factors, 'academic careerists' and 'taxonomy' of 'affinity group affiliates', which constitutes the majority of the groups in the student' involvement experiences' classification, with his extensive research with university students actively serving in student clubs. Furthermore, the fact that the number of professional-academic and thought clubs in Turkish universities is high reveals that "students take part in clubs to make further contributions to their cognitive developments" (Terenzini et al., 1996), as well as numerous factors which also attests that this finding is also a valid case for Turkish univers.

A second category in which student clubs at Turkish universities are clustered the most is social responsibility and awareness. It was observed that the clubs with social health and solidarity are more abundant than other social responsibility groups. The study also recognised that there are many student clubs in terms of contribution to the natural and cultural environment and positive discrimination-awareness. This can be interpreted as an indication that conscious awareness (Chi, 2000; Dey et al., 2010; Jones & Abes, 2004; Pascarella & Terenzini, 2005; Smith, 1994) such as volunteering and sensitivity in students at Turkish universities has an influential role in establishing a club. Thirdly, the concentration of student clubs at Turkish universities in the formations related to culture, arts, and sports activities is in line with the "cultural collegiate and athletes" classification of Dugan's finding (2013). This is similar to how Cooper et al. (1994) determine student clubs' cultural/social participation function.

According to the findings of this study, student clubs at Turkish universities, which stand out with their professional/academic, cultural/artistic/sports, and social responsibility activities, tally up with the diversity of students' participation in campus life in the study of Elkins et al. (2011). Besides, the distinction of "professional/departmental, sports, and special interests (hobby-oriented)" in the study of Dunkel and Schuh (1998) is likewise seen in the findings obtained in this study. In this sense, it can be said that student clubs in Turkish universities show similarities with foreign examples, except for organisations such as "Greek letter organisations, honour society, and fraternity/sorority" (Dugan, 2013; Pascarella & Terenzini, 2005) seen in American/Anglo Saxon and certain European universities. The similarity of the distribution of student clubs in the Turkish state and foundation universities also shows a co-formality case (Emil, 2020); described in theories as "being influenced by organisations like them and by widely adopted models" and "compelling factors of institutional actors" (Usdiken et al., 2017) which is largely valid in Turkish universities, too.

The results of this study in terms of unveiling the diversity of student clubs at Turkish universities can be deemed an outset for universities and researchers to converge more on student clubs. It is important how students use their free time as much as the academic and social skills they will attain during their higher education period. Considering how much the habits collected during this period will significantly impact the future (Akyuz & Turkmen, 2015; Lapa & Ardahan, 2009), it appears inevitable for universities to make theoretical and practical approaches with more scientific and academic methods. Therefore, the reasons for the membership/participation of the students in clubs, which are the most concrete reflections of student participation, the reflections of club activities on the achievements of students, the actual and legal status of clubs, and the aspects to be exploited should be examined comprehensively in higher education. This also signifies that, for decision-makers and practitioners in the higher education system, diversification in student clubs must be supported and coordinated to monitor students' attitudes and skill development towards external pressures related to learning outcomes. As in the Middle East Technical University case, practical methods such as the use of club activities as an efficient method in introducing the university to candidate students will contribute to the solution strategies of the Turkish state and foundation universities, whose quota occupancy problems are increasing daily.

Although the diversity and number of student clubs at Turkish universities are regarded as positive, there are still several issues on which universities should focus and develop. Designing student club more visibly, making them easily accessible on the website, and popularising/developing portal applications with detailed and updated information can be recommended for universities. In this sense, it can be expressed that practices such as the Student Club Coordinatorships and Student Club Management Units, which are encountered in some examples of Turkish universities, will make positive contributions to this problem. However, it should not be disregarded that the most notable contribution to the visibility and ease of access of student clubs can be presented in universities with a structure such as in "Student Club Unions" (where students can represent their clubs with a participatory management approach and strengthen their relations with the university administration). Functioning/operating such a structure, examples, and practices, which can be seen primarily in England, continental Europe, American, Leeds, and Cardiff universities as well as Istanbul Technical University, Istanbul Aydin, Cag, and Ataturk universities in Turkey, will make significant benefactions to the advancement of participatory and democratic cultures of universities.

It is a difficult sine qua non to make new student-oriented arrangements in Turkish student clubs' financial and organisational structures. The continuity and sustainability of the clubs should be improved by rising institutional, structural, operational, and financial support that enable student clubs to be professionally accessed and visualised on social platforms (Manisa Celal Bayar University example) other than universities' websites.

Research enriched with qualitative/quantitative methods can be conducted with student interviews who were previously or are still club members to reach more detailed information about clubs' activities for future studies. In addition, students' expectations from student clubs, their potential and concrete gains can be explored in depth. Student clubs at Turkish universities can be analysed comparatively with cases at universities in foreign countries.

The most prominent limitation of this study is handling student clubs only through universities' websites and performing diversity analysis by name. This may be considered the foremost paradox of the general categorisation of student clubs that have multiple purposes and carry out various activities, as in a professional student club performing social responsibility. It is, however, quite possible to defeat this paradox via studies that analyse the aims and activities of clubs with multiple research data and methods. That way, the findings and results in this study, which is analysed through many data and internet documents, can be further enriched, and additional contributions can be made to the implications in higher education literature and practice.

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The Behavioral Patterns and Social Skills of Young Children with/without Disabilities at Home and at School*

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Abstract: Children with/without disabilities who are in early childhood display specific behavior or social skills depending on their age development. Most children display problem behavior and poor social skills. It is very important to examine the behavior patterns of children for planning early prevention interventions. This study aims to evaluate the problem behavior and social skills level of young children with/without disabilities based on the thoughts of first caregivers, teachers and staff. This research is phenomenological research which is one of the qualitative research method designs. 27 first caregivers, 12 teachers and seven staff participated in the study. This study was conducted at a state kindergarten where inclusive education was implemented. The data were collected using semi-structured individual and focus group interviews. The data were analysed using the descriptive analysis technique. The findings obtained in this study showed that children displayed similar problem behaviors in home and school settings. To the participants, children had many problem behaviors and inadequate social skills in early childhood. These problem behaviors were regarding externalizing, internalizing and antisocial behaviors. As a conclusion, permanent prevention studies are suggested considering the problems which were experienced with the children with/without disabilities in this study.

Keywords: Early childhood, problem behavior, social skills

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Introduction

Early childhood refers to ages 0-8 of an individual (United Nations Children Fund [UNICEF], 2001). The Ministry of National Education (MoNE) stated in Pre-school Education Program (2013) that the pre-school period comprises children of ages 0-6. The early childhood period is the most critical period in the life cycle of an individual since the intellectual, language, sexual, psychomotor, physical, moral, emotional and social development start in this period. When the individual completes these developmental periods healthily, this directly influences the latter developmental processes of the individual. For instance, a child who does not experience a healthy social-emotional development may be unhappy and restless and may pose a risk for problem behaviors. Problem behaviors may prevent an individual from having appropriate communication with people in their environment and developing appropriate social skills (Melekoglu, 2017). When the pre-school program of MoNE (2013) is analyzed, it is observed that the expected learning outcomes for children 36-72 months are a total of 17 learning outcomes, such as self-recognition, self-confidence, being respectful, fulfilling responsibilities, obeying rules and solving problems. Teaching these learning outcomes to children is of critical importance (Young et al., 2012). According to Dereli-İman (2013), children who have good problem-solving skills display prosocial skills. On the other hand, children who cannot cope with difficulties may display antisocial behavior, such as temperament and aggression (Melekoglu, 2017).

Teachers in Turkey and other countries encounter various problem behaviors in children. It is observed that researchers (Golly et al., 1998) have tried to draw attention to problem behavior, and have focused on studies on problem behavior since following the 1990s and onwards there has been an increase in problem behavior at schools (Alisinanoglu et al., 2012; Sugai and Horner, 1999). Johnson and Monn (2015) have expressed that there is still a great amount of problem behavior at schools and that there is a need for intervention to prevent and reduce problem behavior.

According to the conclusive report of MoNE and UNICEF (2013) on the research entitled "The Reasons for Grade Repetition and School Drop Out in High School " and "Identifying the Qualities, Educational Backgrounds, Employment and Needs of Children Aged 14-18 Who Are Exclusive of Formal Education: the average age of children who had repetive grade in the educational year is 16,3. The majority of these children are males. According to the statistical reports of 2010-2011, grade repetition is mainly observed in ninth grade (14,1%). The same report states the reasons for grade repetition as reasons related to school, domestic reasons, personal reasons, the previous school experience of the child and the child's readiness level for secondary school. The children have described the main reasons for drop out as not liking school, failing in classes, not having a habit of studying regularly, not being able to make friends and failing to adapt to the new environment. Based on the results of these studies, it is necessary to start preventative systematic intervention to problem behavior in early childhood (Melekoglu, 2017). Faul and colleagues (2012) have emphasised that it is a must to intervene with problem behavior until the end of third grade in primary school using evidence-based practices. When there is a lack of early intervention to problem behavior, the problem worsens, intervention takes a much longer time, and a need for stronger intervention arises (Golly et al. 1998). Interventions in early childhood are preventive, whereas interventions in later stages may have therapeutic purposes and may require interdisciplenary approaches. Thus, it is vital to study in detail and analyse the problem behavior and social disabilities displayed by children in early childhood to specify the causes of such behavior to develop appropriate intervention (Melekoglu, 2017). Identifying the problem behavior and social skills of children from early ages onwards provides an indirect positive achievement in social and environmental conditions. Problem behavior initially affects the individual and his/her family. Later on, the problem behavior affects the immediate environment of the individual and the state in terms of time, money and psychology (Golly et al., 1998; Melekoglu, 2017). Research shows that meaningful and desired results can be achieved with problematic children only if there is evidence-based systematic applications which is based on the cooperation of people and institutions who are effective in the life of the individual (Faul et al., 2012; Golly et al., 1998). Park and Lynch (2014) emphasized that it is important that the problem behavior displayed by the children do not continue in the following years and that there is intervention before starting school. Problem behavior which is observed at younger ages change dimension over time, and become a chronic disease. Thus, it is vital to identify and teach behavioral expectations and social skills appropriate to the ages of the children by having cooperation between the home and the school systems. It is emphasized that the social-emotional development of pre-school children is vital for the future life of the individual, and that most small children have problems with social adaptation skills; for this reason, teachers and researchers should place emphasis on the teaching of pre-school behavior and social skills (Algozzine et al., 2010).

According to related literature, there is research on the problem behaviors and social skills of children aged 0-6 (e.g., Akcinar and Baydar, 2018; Isık, 2021,) but these studies usually aim to identify situations using quantitative methods. However, to develop evidence-based early intervention programs, in addition to identifying the level of problem behavior, there must be in-depth research on the causes of problem behavior and lack of social skills as well as studies with qualitative approaches to analyse the problem (Tomris, 2012). To our knowledge, in the literature, there are no studies in which the problem behavior and social skills of children with/without disabilities at home and school environments, are studied in detail, and in which data have been obtained from different target audiences and compiled. However, there is limited research in which the problem behavior of the children was tried to be identified by collecting separate data from mothers and teachers of specific groups (Yagan Guder et al., 2018).

Based on the reasons stated above, this study aims to evaluate the problem behavior patterns and social skills of children with/without disabilities at home and at school, from the point of first caregivers, teachers and staff. Thus, answers were sought to the following research questions:

1. What are the thoughts of teachers and staff on the problem behaviors of children at school?

2. What are the thoughts of first caregivers on the problem behaviors of children at home?

3. What are the thoughts of teachers and staff on the social skills of children at school?

4. What are the thoughts of first caregivers on the social skills of children at home?

Method

For this study, the phenomenological research approach, which is a qualitative research method, was used (Ersoy, 2019; Yıldırım and Simsek, 2013). During the research process, semi-structured individual and focus group interviews were conducted to collect in-depth data on the same topic concerning the exprerience and the observations of the multiple participant groups. As the interview questions consisted of multiple questions and sub-questions, the data were analysed using the descriptive analysis technique to conduct an appropriate and easier analysis.

Participants

Children

This study included all the children who aged 3-6 (36-66 months) enrolled at morning and afternoon groups in a public kindergarten school in a central borough of Eskisehir in 2015-2016. Eighty-five children were enrolled in the morning group and 161 children were enrolled in the afternoon group.

Teachers of nine classes participated in this study. Participation permission forms were sent to the first caregivers of all the children who were enrolled in the classes of teachers participating in this study. The first caregivers filled in these forms and sent them back to the researcher. Four morning groups and five afternoon groups were included in this study. The first caregivers of 152 children let their children participate in this study. Permission for this research was requested from the ethics committee of a university and the Provincial Directorate of National Education. The teachers and staff shared their thoughts by taking all the children into consideration. However, only the information on children who had a voluntary participation form is presented in Table 1.

When Table 1 was analyzed, it was observed that 84% of the children live with their parents, whereas 16% lived either with their mothers or their fathers.16% of the children experienced problems with eating. Children experienced eating problems, such as not wanting to eat by themselves, choosy eating, wanting to eat while walking around or being busy with a technological device (such as watching TV or drawing attention to something else).

Table 1.

The Demographic Information of Children

The Characteristics of the Participants	N
Gender	
Female	41
Male	74
Age group	
Three years	20
Four years	49
Five and six years*	76
Birth Order	
1.child	96
2. child	41
3. child	5
4. child	2
Number of siblings	
One sibling	42
Two siblings	36
Three siblings	5
No siblings	61
First caregivers	
Mother	109
Father	5
Close relative	25
Caregiver	2
Number of years at the institution	
Two months	72
1 year	23
2 years	48
Types of disabilities	
Needs diagnosis for**	8
Down syndrome + language and speech disabilities	1
Autism spectrum disorder (ASD)	5
Cerebral palsy	1
Language and speech disabilities	4
Intellectual disabilities + language and speech disabilities	1
Family members	
Mother and father together	123
Mother and father separated	12
Lives with mother	6
Lives with father	3
Mother or father deceased	1
The eating habits of children at school	
Eating the food appropriately	121
Having problems eating	24

* Mainly children aged five (60-66 months) enroll for this group. However, there are six six-year-old children in this group.
** Children who have a medical report or have received a recommendation from a specialist (e.g., doctor, psychologist) to undergo special educationbut do not have a formal medical or educational diagnosis

Teachers

There is information about the characteristics of teachers in Table 2. All of the teachers participating in this study were females and graduates of the department of Pre-school Teaching. As shown in Table 2, 80% of the teachers were aged between 25 and 36. There was at least one child with disability in each class.

Table 2.

The Characteristics of Teachers

Participants	N
Age group	
25-30 ages	3
31-36 ages	5
37-49 ages	5
Educational background	
Bachelor's degree	6
Open education	5
Professional experience	
1-5 years	4
6-9 years	2
10-20 years	5
The age group of children	
Children 36-47 months	2
Children 48-59 months	2
Children 60-66 months	5
Children with disabilities in class	
Yes	9

First Caregivers

First caregivers referred to the people who were responsible for the first care of the child. The first caregivers to be interviewed were determined by the mixed sampling method. The following criteria was used for choosing the sample: (a) People who the researcher could easily have access; (b) people who made a personal application to the researcher for an interview; (c) people who contacted the researcher with the guidance of the school administration and the teachers; (d) people with whom the researcher had contact during the opening and closing hours of the school and agreed for an interview. In addition, the following criteria were considered:

1. Conducting an interview with at least two first caregivers in each class
2. Conducting interviews with families who were willing
3. Conducting interviews, especially with the families of children with disabilities
4. Conducting interviews with first caregivers whose children displayed problem behaviors or whose children had insufficient or no social development.

There is information about the characteristics of first caregivers in Table 3. To the Table 3, the majority of mothers were 30 to 40 years old and housewives. 47% of mothers were graduates of either high school or secondary school, whereas 45% had Associate's Degree or upper degrees. Although the education levels of mothers participating in the study were quite high, most of them do not work. Especially the mothers of children with disabilities were not working. When we looked at the fathers' information in detail, it was seen that most of them are 30 to 40 years old and had high school degrees. It was also observed that most of them were workers or self-employed.

Table 3.

The Characteristics of the Mothers and Fathers

Participants	N	%
The Mother's Age		
25-29 years	32	22,5
30-39 years	95	66,9
40-49 years	15	10,6
The Father's Age		
25-29 years	12	8,3
30-39 years	97	67,4
40-49 years	28	19,4
50-59 years	7	4,9
Academic Degrees of Mothers		
Primary school	17	12
High school	50	35,2
Associate's Degree	16	11,3
Bachelor's degree	52	36,6
Graduate	7	4,9
Academic Degrees of Fathers		
Primary School	11	7,6
High School	51	35,4
Associate's Degree	30	20,8
Bachelor's degree	36	25
Graduate	16	11,1
Mother's Profession		
Housewife	60	42,3
Teacher	18	12,7
Other	46	32,2
Father's Profession		
Worker	30	20,8
Self-employed	34	23,6
Teacher	12	8,3
Artisan	9	6,3
Other	32	23,1

Staff

There were nine school staff. One of them was the cook, two of them were the assistant teachers in the classrooms and the others were the doorkeeper. Most of the staff was 35 years old or over and worked full time. The findings showed that most of the staff had been working at the institution for at least five months full time. During the study, data were collected from the staff by a focus group interview.

Data Collection Procedure

The data were collected using semi-structured focus group and individual interviews. Semi-structured individual interviews were conducted with 10 teachers and 24 first caregivers. A semi-structured focus group interview was conducted with seven staff. A report writer was accompanied by the researcher during the semi-structured focus group interview.

In this research, the researcher prepared semi-structured open-ended interview questions to obtain the thoughts and suggestions of teachers, staff and first caregivers on the problem behaviors and social skills of the children with/without disabilities. The researcher prepared 10 to 12 open-ended draft interview questions and sub-questions related to these for each participant group. In addition to the interview questions, nine interview themes were prepared to create interview coding keys within the context of the purpose of research questions and draft interview questions as the qualitative data would be analysed using the descriptive analysis technique. As the second step, the researcher sent these draft semi-structure interview questions and the draft interview coding key to 14 expert researchers, which were eight researchers from special education, one researcher from pre-school education, three of them from psychological consultancy and guidance, and two researchers who were experts in qualitative research to get the views of other researchers. All experts gave feedback to draft interview questions and draft interview coding keys.

As the third step, some changes were made in the expressions in the interview questions within the framework of the feedback received from researchers, questions that were thought to be similar were eliminated from the interview form, and sub-questions were added to some questions. The same corrections were made in the interview coding key.

Data Collection Process

All of the interviews were conducted by the researcher. The interviews were mainly conducted in a research room which was allocated to the researcher in the practice school. The interviews were conducted at times and in places which were suitable for the participants using appointments according to the details presented by the participants themselves. During the interviews, 'Agreement Forms" and "Personal Information Forms" and a digital voice recorder were used.

"Agreement Forms" were presented to the participants before the interviews to be read and signed. Following that, data on the interview and "Personal Details Form" were filled in by the interviewer. The researcher informed the participant about the research process and the purpose of this study. Upon the completion of these steps, voice recording was initiated. When the voice recording was initiated, the researcher also received verbal approval from the participant and started the interview.Before the focus group interview, each participant was given a coded name as "Participant 1, Participant 2" and a name tag was pinned to each participant. During the interview, an academician was accompanied by the researcher as a report writer.

Data Analysis and Reliability

Data entry. During this process, the recordings of the interviews were transcribed as word documents without making any changes. Following that, the data which were documented were filed systematically. 30% of the total data were selected and were handed in to another researcher not participating in this study. In this way, reliability was ensured while documenting the data obtained in the voice recordings. During the process of correcting the documents, corrections, such as the date of the data, the codings for the interviewees and names, duration of the interview and spelling mistakes were made. As a result, it was observed that the voice recordings were documented 100% correctly. The names of each participant were coded as teachers, T1, T2, T3; first caregivers FCG1, FCG2; staff S1, S2; Coded names were used for children who were mentioned in this study.

*Creating interview coding keys.*To create the interview coding key, the researcher created the general framework/main themes of the qualitative data based on the interview questions, sub-questions and the conceptual framework of this study. A coding form was created for the data obtained from the teachers and staff and a separate coding form was created for the data obtained from first caregivers.

*Entering the data into the coding key.*The data on the interview forms were read and written under the related code using pen and paper. The same procedure was conducted for all data. When the data were written under the main codes, data on similar topics were grouped in sub-themes under the main heading. While the sub-themes for the data on the problem behaviors and social skills of the children were being created, the sub-themes of Preschool and Kindergarten Behavior Scales- PKBS-2 adapted to Turkey by Alisinanoglu and Ozbey (2009) were considered.

*The inter-reliability of coders.*After the coding keys were filled in by the researcher for each interviewee, the inter-reliability of coding was made. To select the data with which the coding reliability would be made, the researcher numbered each data separately. For the reliability data, 30% of each interview group was selected using a simple random sampling method. Before the coding process, the researcher informed the other researchers on how she used the descriptive analysis technique, and the coding keys. A sample coding was carried out. Following that, the other researchers read the data independently and coded the appropriate themes for the interview coding keys. No comments were made during the coding procedure. For any theme that did not fit into any coding, another theme called 'other 'was created, and the codings were made under this theme.

To calculate agreement percentage, the sub-themes and the related items under each main theme which were coded by the researcher and another researcher were controlled. The agreement percentage was determined by coding 'Agreement' and 'Disagreement' by the other researchers. If the researcher and the other researchers coded the same theme under the related main theme, this was considered to be 'agreement among researchers'; if the researcher and other researchers coded different themes, the coding made by the researcher was taken as reference, and this was considered to be a 'disagreement'. The calculation for the agreement percentage was carried out separately for each interview group, of whom 30% were selected. The result of this formula must show a reliability percentage of at least 80% (Miles and Huberman, 1994). For this research, the coding reliability among other researchers was determined as at least 80%. The coding reliability of the first researcher was 89,78%, and the coding reliability of the second researcher was 80,91%.

Findings

The findings were presented as the findings from teachers, first caregivers and staff respectively. In this study, there were several sub-themes under each theme. Thus, to present these themes to the reader in an organised and meaningful way, the Scale for

Kindergarten Behavior and the behavioral descriptions of these factors were considered. The scale consists of two independent scales as *Social Skills Scales and Problem Behavior Scales*. The problem behavior scale consists of four factors: Extrovert, Introvert, Anti-social and Self-centred; The Social Skills Scale consists of three factors: Social Cooperation Skills, Social Independence and Social Acceptance Skills and Social Interaction Skills (Alisinanoglu and Ozbey, 2009).

The Thoughts of Teachers on Children' Behavior at School

The thoughts of teachers on children' behavior at school were shown in Table 4 and according to Tablo 4, there were two sub-themes under the main theme, "problem behavior of children in the classroom and at school". A majority of teachers stated that children display problem behavior in the classroom and at school. To this study, the class in which the most problem behavior was observed was the class of the teacher coded T9. T9 expressed the problem behavior in her class as follows:

> There are 22 children in my classroom. When we accept three of them to be really problematic, there are 19 children left. With these three children, the problem behavior is really serious and this disturbs the whole class (T9).

Table 4.

The Behavior Definitions of Children from the Point of Teachers

Problem Behavior observed in the Classroom and at School
Yes, (There is problem behavior.)
No, (There is no problem behavior.)
Problem Behavior observed in the Classroom
Displaying extrovert behavior Self-centred behavior Displaying anti-social behavior
Problem behavior observed in school dining room and restrooms
Displaying extrovert behavior Problems related to eating habits
Problem behavior observed in the school playground
Displaying extrovert behavior Self-centred behavior Displaying introvert behavior
Other problem situations
Problems related to self-care Lack of academic skills Linguistic, speech and communication problems Attention Deficiency
Factors that trigger problem behavior Factors related to the child
Factors related to the school
Factors related to parents

When Tablo 4 was analyzed, three sub-themes were created under the main theme, "problems encountered in the classroom".These sub-themes are "extrovert behavior, *self-centred behavior and anti-social behavior"*. According to the teachers, the children mainly displayed extrovert and self-centred behavior. The sub-theme displaying extrovert behavior includes *"refraining from group activities, not wanting to obey rules, talking loudly, spitting, fighting, giving harm to friends and objects and not sharing things with others";the sub-theme displaying self-centred behavior includes* "expecting attention and affection all the time, *asking people to do things by crying"; the sub-theme displaying anti-social behavior includes; not* wanting to go to school or kindergarten, *trying to run away from school and being restless*. The teachers stated the problem behavior they had observed in the children was as follows:

> I do not want violence. This has been my biggest challenge so far. Yes, they do resort to violence. I mean, what makes me really sad is that they use violence even when they are playing. Now, they would do that in their free time (T10).

> I mean, I do not want to categorise the children as children who obey the rules and children who disobey the rules. However, the problem children do not understand instructions, they do not obey rules, and they become aggressive as they can not share. And their actions turn into harmful ones (T12).

The teachers believed that the children displayed behavior similar behavior outside of class to the problem behavior they displayed in the classroom. As can be seen in Table 4, most of the children displayed behavior, such as 'not wanting to eat, finishing the meal in a long time, not wanting to eat and choosy eating' under the main theme of "displaying extrovert behavior in the cafeteria and the restrooms". The sub-theme 'displaying extrovert behavior' included behavior, such as "playing with one's nose, *being aggressive, not listening to instructions, ignoring teachers and not washing hands appropriately"*. Some teachers stated the problem behaviors displayed by children in the dining room as follows:

> …some of my children have problems with using spoons and forks. …I warn them by saying something like hold the spoons with three fingers (T12).

> …Problem behavior I have observed in my children about eating habits… I have children who are picky about food at home; their parents cook whatever they want. Similarly, they do not want to eat at school, they cry when they do not want to eat, they do not want to come to school (T4).

As shown in Table 4, under the main theme, "problem behavior encountered in the school playground', the sub-theme 'displaying extrovert behavior includes'; "throwing away toys*, not playing appropriately with the toys, not showing respect to different teachers, using force to get objects from friends, not being able to generalise rules"; the sub-theme 'displaying self-centred problem behavior' includes; "jealousy, complaining about others all the time, showing reaction to rules (crying, stamping), having a tantrum when warned"; the sub-theme 'displaying introvert behavior'* was identified as *"fear of becoming separated from parents"*. For instance, the teachers stated the problem behavior generally displayed by children on their school guard duty days:

> If you are on guard duty at school, the children do not usually listen to teachers of other classes. They listen to their own class teachers. For some behavior, their own class teacher may have to attend to them. Like they can not tie their shoelaces, the other children falls on him/her, we try to get them in line on the school bus (T10).

> Another teacher said: There is big trouble on school buses. Some children are in the mood for being aggressive and harming others. They were using the sharp points of their water bottles to harm each other. We have such files…(T12).

When the teachers were evaluating the problem behavior of children during the interviews, they did not only reflect on their problem behavior; they talked about all the problems they experienced with the children. When the data were analysed, if the problems encountered by teachers in the classroom or at school did not fit into the category of problem behavior, such data were named as the main theme 'other situations'.The sub-themes *"experiencing difficulties with self-care, academic skills, linguistic skills and communication skills, and attention deficit" were created within the context of other problem situations encountered by teachers*. According to the children, the average attention span of children on an activity is 15 minutes.

According to this study, the sub-theme speaking and communication problems included *"falling behind in language use, having a limited vocabulary", and "the childish talk of children in the lower age groups, and the children not being able to articulate some words and phonemes"*; the sub-theme lack of self-care skills included the problems "*not being sufficient in dressing oneself, not recognising objects belonging to oneself, not willing to feed himself/ herself";* the sub-theme for experiencing a deficiency in academic skills includes the problems "*not being able to understand and follow the instructions of the teacher, needing individual support for preparatory reading-writing activities"*.

According to the literature, there are some factors related to school or the home that trigger the problem behavior of the children. As shown in Table 4, the main theme, "the factors that trigger problem behavior" consists of three sub-themes which are "problems related to the child, problems related to the school, and problems related to the family".The teachers have emphasized that the cause of problem behavior in children is related to the individual characteristics of the child. 92% of the teachers believe that most of the problem behavior stems from the child itself. The sub-themes factors related to the child include the factors "*the children acting impulsively, their being in the environment for the first time, the children being selfish, the individual characteristics of the children, being advanced or behind in some developmental areas, being too young or old, or having disabilities"* .

The participants stated that the factors that triggered the problem behavior of the children were not always the same and were not caused by only one factor. In this respect, another significant factor that caused the children to display problem behavior was factors related to school. The sub-theme factors related to school includes *"factors related to the physical conditions of the school and the classroom (crowded classes, not having assistant teachers in class, inappropriate classroom settings) and factors related to in-class practices (the activities being too high or too low for the level of the class, an insufficient collaboration between the family and the school)"*.

Another factor that increased the frequency and the intensity of children' problem behavior was the sub-theme *"factors related to the family"* .This sub-theme included the factors *"lack of rules at home, the family not providing sufficient opportunities to the children, the parents being too busy, lack of affection, bringing up the children as over-sensitive individuals,* *differences in the attitudes of parents"*. Some teachers had clearly stated the factors that triggered problem behavior:

> I cannot understand if it is instinctive, or what the child experiences at home or the behavior at home. I mean, what are the causes of these. Maybe, the child is trying to say something. It is obvious that there is a problem. Maybe, the children do not know how to express themselves (T4).

> Can is autistic; I mean, he is an inclusive children. If there was something that he did not like, he did not use to eat it. I told his mum to put something that he liked in his bag. His mum used to put things like milk and cake (T12).

To this study, patterns of children's problem behaviors were mostly similar at home and school settings and teachers thoughts about the behavioral patterns of children showed in Table 5. To the Table 5, there are three main themes about children problem behaviors.

Table 5.

The Behavioral Patterns of ChildrenChildrenAccording to the Teachers

The Activities that more Problematic Behavior Observed
Preparatory reading-writing activities
Turkish language activities
Free time activities
The Times that More Problem Behavior Observed
The first and last days of the week
Return from holidays
Entrance and exit times at school
Collective celebrations
The Intensity of Problem Behavior
Children who are in the age three group and the 5-6 age group display more problem behavior.
Boys have more tendencies for violence.
Interventions do not affect the behavior.
Most of the children who do not obey class rules do not obey school rules and rules at home, either.

There were different daily activities in preschool institutions. As shown in Table 5, the main theme, "the activities that more problem behavior observed," included three sub-themes: preparatory reading-writing activities, Turkish language activities and free-time activities. Teachers stated that during the preparatory reading-writing activities, some children had problems understanding the instructions; some were not interested in the activities, while the activities were very easy for some children. In general, the children had a short attention span. The teachers also said that the children did not want to sit during Turkish language activities, started to display problem behavior shortly after the activity started, whereas some children with disabilities had difficulty keeping up with the activities. The activity with which nearly all of the teachers experienced more problems was mostly the free-time activity. The free-time activity was usually the first activity of the day. Children who came to class during this hour played games in the learning center or in the classroom on their own will or with the directive of the teacher. They played either on their own or with their friends. According to the observations of the researcher in the classroom and the data obtained from the teachers, during the free-time activity, the children played out of control. When the free-time activity was over, the toys were scattered all over the place. The teachers stated that the children did not want to share toys during free-time activities, they did harm to the toys and their friends, they spoke really loudly in class, and those specific children played hyperactive games and always played in the same centre. More than that, the children did not want to tidy up the classroom after this activity. The teachers also stated that they could not show sufficient individual interest in the children during reading-writing, Turkish language activities and other group activities as the classes were really crowded and that they could not have individualization in education.T4 desribed the problem related to the activities as follows:

> …I wonder why we experience more problems with mostly reading- writing activities I mean books and reading and writing stories, what causes that? They have difficulty understanding instructions (T4).

As shown in Table 5, the main theme "the time that more problem behavior observed" consists of the sub-themes: "the first and last days of the week, return from holidays, the entrance and exit times of school and collective celebrations".Teachers mentioned that children displayed more problem behavior during specific times. T9 described the moment during which she observed the most problem behavior as follows:

> …While we are waiting for the school bus, we gather in that corridor. I think that place is not enough, what should I say that it gets bored the children. They put on their shoes and we make them wait there, that makes them bored (T9).

As can be seen in Table 5, the main theme "the Intensity of problem behavior" consisted of four sub-themes. The teachers stated that younger and older age groups displayed more problem behavior compared to four-year-olds. They stated that the three-year-old group mailnly had problems adapting to school life and displayed selfish and introvert behavior, whereas the five-year old group displayed intensive extrovert behavior. T9 explained the problem behavior she observed in her class as:

> …The third one does not listen to me at all. They are all boys, I talked to their mothers, but they do not accept that their child is problematic, that their children display problem behavior. I mean, maybe I shoul not say the child is problematic. The child is actually good, but although it is his third year, he has difficulty recognising colors and shapes.

The Teachers' Thoughts on the Social Skills of the Children

The data obtained from participants on the social skills of the children were created as sub-themes by considering the factors of the PKBS scale under the heading research question on social skills. The information was shown about the social skills of the children and inclusive education practices in Table 6.

When Table 6 was analyzed, there were three sub-themes under the main theme, "the social skills levels of the children". The children were quite insufficient in especially "social independence and social acceptance skills". The sub-theme disabilities in social acceptance and social independence skills include the following situations according to the ages of the children: *"not being able to eat on his/her own, not being able to dress and undress, having difficulty in recognising personal belongings, not being able to carry out tasks on their own, lack of self-confidence, not having a complete sense of trust, not being able to defend* *oneself, fear of different social environments, having difficulty in adapting to different social environments, preferring to play alone, not wanting to join a group, not behaving in accordance with the rules of the group, fear of separation, and extreme dependence on the mother and the father".*

Table 6.

The Social Skills of the Children and Inclusive Education Practices According to Teachers

The Social Skills of the Children
Lack of social independence and acceptance skills
Lack of social communication and interaction skills
Lack of social cooperation skills
Inclusive Education Practices
Teachers and other staff being incompetent in special education practices
Problems encounter in inclusive education practices
Social adaptation and acceptance are sufficient in schools
Lack of social skills of children with disabilities
There are assistant teachers
Behavioral problems in children with disabilities
Lack of academic skills of children with disabilities
Lack of self-care skills of children with disabilities

The sub-theme social communication and interaction skills included skills, such as "*avoiding communication with and talking to others, not being able to use eye contact, not being able to show empathy, not greeting others*". Problems with social communication and interaction were mostly observed in children with disabilities. The sub-theme social cooperation skills included behavior, such as *"not wanting to share, not wanting to get in line, not waiting appropriately when one has to wait, problems with obeying rules"*. A teacher explained that:

> There are children who are really good, quite advanced; there are ones who are average, they have no social communication with friends, I mean I sometimes suspect that they are children with disabilities. They also do not respond, there is no reaction when I talk to them, and when I call up to them, there is no response. They act as if there is nobody there (T2).

As shown in Table 6, there were six sub-themes under the main theme, "inclusive education practices". Two of these sub-themes were positive, whereas the other themes included negative situations about inclusive education practices. Children with disabilities were socially accepted by others. However, all of the teachers were incompetent in special education and inclusive education practices, and various problems were experienced at the school concerning this situation. The sub-theme problems experienced in relation to inclusive education practices included, *"the class is not arranged according to the legal procedures of inclusive education practices in pre-school institutions, the number of children with/without disabilities in a class is quite high, there is lack of cooperation between the other institutions at which the children receive education and the Research Centre (RAM) where the children were diagnosed"*. Special arrangements were made so that children with disabilities could come to school about 30-60 minutes later and leave earlier than the other children. In addition, the first caregivers of the children were guided to hire an assistant teacher to help the teacher and the child when the child was at school, and many first caregivers hired assistant teachers for their children. The teachers stated that some children with disabilities were not suitable for group education and displayed problem behavior, and they had insufficient social, academic and self-care skills. Some children with ASD have higher academic skills in comparison to their peers. Most of the children with disabilities had communication and interaction problems and experience problems speaking the language. All of the children with disabilities were not able to eat, dress and undress independently like their peers without disabilities.

When the thoughts and demographic information of the teachers were analyzed, it was observed that teachers who graduated from open education faculty experience more problems with inclusive education practices. There was at least one child with a disability in eight of the classes. The thoughts of teachers on inclusive education were as follows:

> …There are special education children in our classrooms. In fact, it is a good thing for my children, for myself, and for my own children. They also need a different child. I mean, I believe I am insufficient about this, special education- there are 18 children, two with disabilities, there are ones who have not been diagnosed but might be (T2).

> I mean, how I should approach these children? For example, concerning autism, I suspected one of my children, they say such things, what is it. I searched on the net, I bought books.For instance, I had a hyperactive children for the first time this year, and how should I approach that child. I asked an instructor at university, he said that I had to use imperative sentences. Can sit here? It was very difficult for me because I had never used imperative sentences in my life. I had to talk like a commander (T11).

The Thoughts of the Staff on the Problem Behavior and Social Skills of Children at School

The thoughts of the staff on the problem behavior of the children at school were the same as the thoughts of the teachers. The staff also believed that the children display problem behavior at the dining room, in the restrooms, and in the playground. S1 said that:

> Well… when they obtain permission from the teacher to go to the restroom, they run around in the corridor. They run to the restroom. I think that this is also a problem because they may slip and fall (S1).

According to the staff, the age group which displayed the most problem behavior are the three-year-olds and the five-year-olds, and the interventions to the problem behavior of these children were not very effective. According to the staff, problem behavior increased as the children become older. S2 described this as follows:

> I think that the five-year-old group is very active. Some time ago, a child bumped into me. I found myself by the wall. I wonder what would happen if that child crashed into a smaller child (S2).

In addition to this, the children displayed problems with social skills about using the right tone of voice, getting in line, and having the right communication with friends. The children tend to disobey rules and the assistant staff had difficulty controlling their behavior. S4 says:

> Well, the children talk too loudly. Do you mean their daily speech when you say they talk loudly? I mean when they are playing they scream (S4).

The staff mainly deal with the problems in self-care in children and the problems experienced in the dining room. According to the staff, the children did not want to do what they had to do independently. The children were quite insufficient in skills, such as eating, getting dressed, getting undressed and recognising their belongings. Some first caregivers expected staff to do what the children should do themselves. S2 believes,

> The children do not recognize their own shoes. The families could tell them about this or maybe the children do not know their shoes because the families send different shoes every day. They forget where they have put the shoes. I mean, they should put on their shoes themselves. I think that the staff should not help the children put on their shoes.

The Thoughts of First Caregivers on the Problem Behavior of Children at Home

During the research process, the first caregivers were asked to evaluate the behavior of the children at home. According to the data obtained from the interviews with the first caregivers, the behavior of the children was grouped as appropriate behavior and problem behavior. Thoughts of first caregivers about problem behaviors of their children were shown in Table 7.

Table 7.

The Behavioral Descriptions of the Children According to the First Caregivers

The Appropriate Behavior of the Children at Home
Being competent in social interaction and communication skills
Adapting to rules in the family
Displaying social cooperation skills
No positive behavior was stated.
The problem behavior of children at home
Displaying extrovert behavior
Behaving egoistically
Displaying antisocial behavior
The appropriate behavior at school according
Having good social cooperation skills
Having good academic skills
Having good psychomotor skills
The problem behavior of the children at school
Displaying extrovert behavior
Disability in social independence and social acceptance skills
Disability in social communication and interaction skills
Acting egoistically
Displaying antisocial behavior
Displaying introvert behavior
Other skills that need to be developed in the children
Academic skills
Self-care and psychomotor skills
Language and speaking skills
The behavior patterns of the children
The problem behavior is mainly related to self-care skills
The child is more dominant in the family
The interventions for coping with problem behavior are insufficient and ineffective

Most of the first caregivers gave brief information on the appropriate behavior of the children and mainly expressed their thoughts on the problem behavior of their children. Nine of the interviewees did not present suitable behavior of the children, and made explanations on their children's problem behavior. A first caregiver who participated in this study explained that:

> He is very merciful. Never hurts people. In addition, he is very helpful. He likes to study, very skilled with his hands. There are so many things I like about him, but he is very stubborn, so there are also things that I do not like (FCG8).

As stated above, some first caregivers briefly mentioned some positive things about their children. First, caregivers who mentioned positive characteristics about their children during the interviews thought for a long time while listing positive things about their children.

As shown in Table 7, three sub-themes were created for the main theme, "the problem behavior of the children at home". Most of the first caregivers stated that the children mainly displayed extrovert and self-centred behavior at home, whereas nine of the first caregivers stated that their children displayed antisocial behavior. According to first caregivers, some children display three types of problem behavior while some only display one type of problem behavior. The sub-theme extrovert behavior included the descriptive analysis findings, such as "*aggressiveness, doing harm to people and things around, hitting the first caregiver, stubbornness, not listening, not obeying rules, not knowing how to play with others, not being able to carry out tasks on one's own, being jealous of siblings, not eating appropriately, irregular sleep, hyperactivity, not wanting to sleep in one's own room, throwing things when angry, and too much interest in technology*". The sub-theme the egoistical behavior of the children included behavior, such as "*expressing their needs by crying, intervention to private lives of the family members, getting bored easily; whereas the sub-theme antisocial behavior includes stubbornness, being insistent on what he/she wants, objecting and constantly crying, being unwilling to go to school, acting confusedly and slowly, running away from school/ home". As shown in* Table 7, it was observed that first caregivers tried to cope with the similar and shared problem behavior of their children. All of the first caregivers stated that their children had problems with eating and obstinacy. Some descriptions of the first caregivers for the problem behavior of their children were as follows:

> They may have behavior that we do not like or some obsessions; for example, now he is obsessed with going up and down the stairs and playing in the lift. If we do not let him play, he has a tantrum. But once he does it, he comes back inside (FCG20).

> What I do not like, I mean he hits us sometimes when he wants to do something, I mean, he does what he wants (FCG11).

> First, let me tell you the behavior I do not like. He is really stubborn. When he wants something done, he cries and shouts until it is done. He shouts a lot, I mean he throws things around, he has such habits (FCG14).

> It would be a lie if I said that I had found a solution for this. I mean, he plays, but I let it go and I thought he would give it up. Because we bought it a short time ago. The other one was out of order, it wasn't repaired for some time, but he started to use our phones. Now he downloads games on our phones all the time. He spends about 3-4 hours with technological games. He has been playing for like one and a half years or two years (FCG7).

As shown in Table 7, six sub-themes were created under the main theme, "the problem behavior of children at school". Most of the first caregivers who evaluated the behavior and social development of their children at school based on the information they received from the teachers stated that their children displayed extrovert behavior at school and had insufficient social independence, social acceptance, social communication and interaction skills. On the other hand, some first caregivers stated that their children displayed egocentric, antisocial and introvert behavior at school. Four of the first caregivers participating in this study stated that they had not yet talked to the teachers concerning the behavior and social development of their children at school and explained that the teachers primarily had interviews with the first caregivers of children who displayed problem behavior at school. Some first caregivers stated that:

> Last year it was the three-year-olds, this year it is the four-year-olds group. We had some problems last year, they had the habit of screaming, I know something as the age three syndrome, I mean they are really ill-tempered. Difficult to take control of (FCG7).

> We had two interviews at school about his disobeying rules at school. He says that he does not obey rules. He has problems with adapting to rules (FCG4).

> I mean I do not pull his collar and go slap slap slap. I only slap him on his bums. Once I was really shocked, he was holding his sibling with both hands and trying to strangle him. I mean I do not know where he learnt that from. If he were to learn from me, I have never done such a thing (FCG25).

Under the main theme, "other skills that need to be developed in children," there were three sub-themes which were "academic skills, self-care skills and language and communication skills". According to 32% of first caregivers, in addition to the behavioral and social developments of the children, they also needed support in academic skills, self-care skills, psychomotor skills and language and communication skills. First caregivers stated that the children fell behind their peers academically, did not understand some instructions, they did not have proper eating habits in relation to self-care, were unwilling to do tasks, had weak hand muscles, and that some children experienced difficulties expressing themselves using language.

The findings showed that 76 % of the participants stated that their children had eating problems. These eating problems were stated as being choosy, not wanting to eat the food by oneself, not eating enough, not eating appropriately (for instance, walking around while eating, eating while watching TV or being busy with other things while eating). 36% of the participants stated that their children had some sleeping problems. These problems did not want to sleep in their own bed, wake up at night and sleep with the parents, not sleep at all, or sleep very late.

There were three sub-themes under the main theme "the behavioral patterns of the children" .First caregivers mentioned that the majority of the problems they experienced with the children were related to the behavioral expectations concerning self-care skills. The main theme 'the behavioral patterns of the children included the descriptive analysis findings which were *"the children refusing to sleep early, the children not eating by themselves, the children being choosy about food, not eating enough, not tidying up their belongings, not being able to dress* *and undress on their own, and not wanting to sleep in their own bed"*. A first caregiver said, "They solve one problem but when the problem is over, another one emerges" (FCG20).

To this study, there are some factors trigger the problem behaviors of the children. According to the first caregivers mostly characteristics of children and attidutes of relatives effect negatively children's behaviors. Information about triggers the problem behaviors of the children were shown in Table 8.

Table 8.

The Factors that Trigger the Problem Behavior of the Children according to the First Caregivers

The Factors that Trigger the Problem Behavior of Children at Home
Factors related to the first caregiver
Factors related to the child
Factors related to the relatives
The Factors that Trigger the Problem Behavior of the Children at School
Factors related to the child
Factors related to school
I have no idea
Factors related to the first caregiver

As shown in Table 8, first caregivers mentioned that there were many factors that triggered the problem behavior of children. According to this, under the main heading "the factors that trigger the problem behavior of children at home" there were three sub-themes which were; "factors related to the first caregiver, factors related to the child, and factors related to the relatives". When the descriptive analysis findings for these sub-themes were analiyzed, the sub-theme 'factors related to family' included the following findings; *"inconsistency in the attitudes of the mother and father, the mother's health problems, the parents having a busy work life, and the parents not having sufficient knowledge on child education"*. The factors related to the child includes the factors; *"the child's health problems, having a difficult pregnancy, being a child with disabilities, the gender of the child, being a single child, being the youngest child, being the first grandchild, and not liking the smell of some food"*.

The sub-theme factors related to relatives described negative behavior, such as how the grandparents treat the child, and a cousin or sibling of the child displaying negative behavior. The descriptive analysis findings for these factors were; *"the life-style of the family, the family's culture (living without a plan), living in a crowded family, the behavior and guidance of relatives, a small age difference between the siblings, the grandparents doing whatever the child wants and interfering with what the parents want to do"*.The sub-theme factors related to school included the descriptive analysis findings; *"being in a crowded classroom, and the teacher being inadequate"*. 28% of first caregivers stated that they had no ideas on this topic.

The Thoughts of the First Caregivers on the Social Skills of the Children

When the data from the first caregivers on the social skills of the children were evaluated, the same procedures used when reporting and defining the data from other participants were used. Thoughts of first caregivers about the social skills of the children were shown in Table 9.

Table 9.

The Social Skills of the Children According to First Caregivers

The Social Incompetence of the Children
Disability in social independence and acceptance skills
Disability in social communication and interaction skills
Disability in social cooperation skills

As shown in Tablo 9, there were three sub-themes under the main theme "the social disabilities of the children". Half of the first caregivers stated that their children had disabilities in social independence and acceptance skills while some of them stated that their children had deficiency in social communication and interaction, and other participants said their children had deficiency in social cooperation skills. The first caregivers explained that:

> Social development is our problem. His social and language skills developed very slowly. For the last 6-8 months our problem is to hear normal sentences (FCG20).

During the research process, data were also collected from the first caregivers of children with disabilities. Thus, interviews were conducted with the first caregivers of four children with disabilites. During the interviews, the participants were asked questions about "what the children with disabilities generally did at home or at school, what their disabilities were, which schools they attended, and general information on the process of diagnosis".The findings about the problem situations of children with disabilities were shown in Table 10.

Table 10.

The Thoughts of First Caregivers of Children with Disabilites

The general condition of children with disabilities
There is a medical diagnosis
The first caregiver does not wish to have diagnosis
Directed to evaluation
Displays disabilities in language and speech
Attends special education institutions in addition to inclusive education
Receives help from assistant teacher
Lack in academic skills
Displays attention deficit and hyperactivity
Experiences problems with social interaction and communication

As shown in Table 10, there were nine sub-themes for the main theme, "the general condition of the children with disabilites". Three of the children had formal medical and educational diagnosis. One child (Cem) had a medical report but did not have an educational report. This child displayed symptoms of ASD. The first caregivers of this child did not want the child to have a formal educational diagnosis because they did not want their child to get affected. According to the reports of the first caregivers, the teachers of the five children guided them to have a specialist's evaluation. The topics that the teachers wished to be evaluated were the behavioaral, social, language, academic and motor skills of the children.

Last of all, most of the children with/without disabilities had incompetence in langauge skills and communication skills. In addition to this, a child with disability received education in an inclusive environment, a special rehabilitation centre or the special education unity of a university. Also, some first caregivers received support from private tutors to take care of the child. The thoughts of the first caregivers of Cem, on special education were as follows:

> That day we took him home helter –skelter. We locked the door on him. At the beginning, he used to cry like an hour in such situations, and had a tantrum. We tried to ignore him, and showed no interest in him. Then, it got better (FCG20).

> We said that Bekir was a different child. When he was like one or two years old, I associated it with autism but of course my husband was not happy about that. He said you think he has autism. I am a mother after all and had heard about some differences from others… When I listened to advice and searched the internet some things overlapped. I went to a psychiatrist to make this clear, but could not complete that (FCG23).

In conclusion, when the behavioral patterns of 3-6 year olds at school and home, and their social skills were investigated, these children displayed problem at school and home environments due to similar reasons. In this respect, it was vital to promote the appropriate behavior and social skills in these children.

Discussion and Suggestions

Discussion

It is believed that in this study, relevant knowledge has been gained on the behavior of children in different situations and their social skills concerning various resources on pre-school age children. According to the findings obtained in this study, children who displayed problem behavior at school similarly displayed the same behavior at home. It has been emphasized that a behavior to be considered a problem behavior, that specific behavior has to be observed in different environments and times as well (Ozyurek, 2013; Vuran, 2010). Consequently, the findings of this study consistent with the literature. The findings obtained in this study showed that in addition to low social skills, the children had academic, self-care and lack of language skills as well as extreme attention deficiency. According to teachers and first caregivers, the children focused on an activity and work on it for a maximum of 10 to 15 minutes. Teachers mentioned that the children displayed problem behavior in the classroom on academic activities, such as "Turkish grammar teaching and preparatory reading-writing activities". In fact, when the presentation of activities in the classroom and the problem behavior of children were analysed, it was seen that some practices increase the frequency of problem behavior in the classroom. For instance, teachers ask four-year- old children to carry out addition and subtraction at school and at home using numbers. As these skills expected of four-year-olds are not appropriate for their levels, the children do not want to carry out these activities and display various problem behaviors to skip these activities. Thus, the children may experience difficulties keeping up with these activities as the teachers do not plan the activities in accordance with the learning outcomes stated by MoNE (2013) for pre-school education and concerning the individual differences of the children. Similarly, physical conditions of the classroom, the planning of activities and the ability of the teachers to handle problem behavior may also trigger problem behavior in children. In this study, it was observed that the classroom environment which triggered problem behavior did not comply with the regulations of MoNE (2012) although learning center practices directly affect the children's ability to learn appropriate behavior and gain social skills.

According to this study, teachers and staff stated the causes of problem behavior in children as "factors related to children, factors related to school, and factors related to families", whereas the first caregivers identified them as "factors related to family, factors related to children, and factors related to relatives".In addition, the participants believe that the main reasons for problem behavior are related to the general characteristics of the children as well as the attitudes and behavior of first caregivers. According to the ecological approach, the main factors that trigger problem behavior in children are home, school, society and other systems (Ozdemir, 2015; Yurtal and Yasar, 2008). In fact, it is seen that a majority of the children whose problem behavior has been studied in the research attended the same school after the age of three. Thus, as stated, although the basic causes of problem behavior are related to the first caregivers and the children themselves, the school system is expected to control the problem behavior, and support the social skills of the children. The majority of the children who display problem behavior at school are three- year-olds and five- six year-olds. While the problem behavior displayed by three-year-olds is usually difficulty to adapt to school and the environment, the problem behavior of five-six-year-olds is mainly extrovert behavior.

During this study, the inclusive education problems at the school were also analysed in addition to the study of the problem behavior and social skills of the children, and it was observed that the school experienced various problems related to inclusive education. Some of these problems were:

1. The number of children in classes were not organised in compliance with the regulations for pre-school education and primary education (MoNE), 2014).

2. The teachers did not have enough knowledge on special education and inclusive education.

3. There were children with disabilities in the classes and children without disabilities but need to be diagnosed. Children with disabilities did not have special education plans, and thus, the teaching-learning process could not be adapted for children with disabilities.

Another problem that the teachers experienced with inclusive education was the lack of a specialist, such as a consultant or a special education teacher that the teachers could consult at school. The teachers emphasized that when there is a consultant teacher at pre-school institutions, intervention to problem behavior and inclusive education practices are more systematic and planned. At that time there wasn't consultant teacher at the school. The cause of so many problems related to inclusive education in a research school is related to the lack of required legal arrangements.

The finding of the study which draws the most attention is that there are problems related to self-care, academic skills and language skills. Teachers and first caregivers have stated that children display problem behavior due to deficiencies in these skills. In fact, according to the learning outcomes in the pre-school education stated by MoNE (2013) children who are three to six years of age are expected to display these skills independently. Thus, this shows that the children have difficulty displaying these skills as they are not exposed to sufficient learning. As the lack of self-care skills in children affect the first caregiver-child relationship and communication skills negatively, this situation gradually leads to problem behavior. It was found out that the children went to sleep at around 10 or 10.30 pm, and the child slept with the parents instead of sleeping in his/her own bed. The eating and sleeping habits of the children are not appropriate for healthy upbringing. The children may be displaying problem behavior due to lack of sleep and nutrition. They may be affected negatively as they share the same bed with their parents.

A lot of first caregivers have stated that they do not exactly know which responsibilities are expected of children at different ages, and thus they do not give too many responsibilities to their children about self-care. Especially first caregivers stated that the children did not listen to them, and they did not have specific rules that they obeyed in the family. It was also found out that the children spent time at home by playing with electronic tools, such as computer and cell phone. It was revealed that some children spent more then five hours using electronic tools. Given that children lack appropriate daily skills is related to environmental factors. When the age groups of the children are considered, they are at appropriate ages for certain skills given that they are provided appropriate learning environments at home and at school (MoNE, 2013). However, as some families have also stated, the children were not provided with an environment with specific discipline and teaching. According to literature, the amount of time spent by pre-school children on technology-based tool is not appropriate for their intellectual, social-emotional, psycho-motor, language and personal development (Kelleci, 2008). Literature suggests that the use of technological tools should be as follows: (a) none for children under two; (b) 60 minutes for children in the 3-5 age group, and (c) two hours for children between six and 18 (Gundogdu et al. 2016). Another deficiency observed in children is related to language and communication skills. Children's over-exposure to technology and lack of high-quality time with others may have affected their langauge development negatively.

When the findings on problems related to the academic skills of the children are analyzed, teachers have stated that they experience too many problems with pre-reading and pre-writing activities, and that some children were more advanced than their peers while others were slow learners. In addition, the children were unwilling to do in-class activities and homework related to these activities. The mathematical activities which were used at school as pre-writing and pre-reading activities are observed to be more advanced than the levels of the children. For instance, the four-year-old group is taught basic addition and substraction activities, and the children are asked to find the solutions in a limited time (Melekoglu, 2017).In addition, as children with ASD have higher academic skills compared to their peers; they complete assigned tasks in a very short time, and get bored and display problem behavior as a result. Based on all these findings, it may be said that the teachers do not take the ages and individual differences of children into account when preparing teaching materials, and that this may trigger problem behavior in children.

Another finding of this study is related to teaching social skills to children. The teachers have stated that the children lack some social skills, such as sharing, self-confidence, responsibility, showing respect, expressing oneself and that they give some roles to the children in the classroom to develop their social skills. When the teachers were asked whether they had specific activities to develop children's social skills, they expressed that they did not have a special program. In fact, various social activities are organised in pre-school, such as celebrating national and religious holidays, carrying out projects, conducting projects with families, going to the cinema and the theatre, and going on for a picnic. The teachers have stated that they organise the specified activities with the participation of the children, but they do not have a specific purpose to support the social skills of children while planning and implementing these activities. Some teachers have even stated that they have difficulty understanding which skills the concept of social skills comprise. When the children do not develop sufficient social skills, they may experience problems with social adaptation skills, and have problems solving these problems (Dereli-İman, 2013; MoNE, 2013; Young et al., 2012).

In conclusion, the findings obtained in the study from different participants overlap with each other, and support each other. According to this, it was observed that the attitudes and behavior of the first caregivers and the teachers, and the educational system directly affected how the children develop appropriate behavior and social skills. When these factors are negative, an increase in the problem behavior of children will be inevitable.

Suggestions

This study focused on the problem behavior and social skills of children with/without disabilities. However, during this study, it was found out that children also experienced problems related to academic, language and psycho-motor skills and self-care. Thus, futher studies may be conducted on the mentioned development areas.

In Turkey, education is managed using a central system. The positive aspect of this system is that although there are differences in implementation, there is unity and cooperation, and it offers education in the same standard. The negative aspect is that it prevents teachers from thinking individually, and there are difficulties in having access to the oppurtunities provided by the central system due to life conditions in different geographical regions. Various systematic problems exist in pre-schools concerning inclusive education. The teachers who participated in this study stated that the consultant teachers at their school supported them considerably. Thus, MoNE should resume having consultant teachers at schools for preventetive special education services.

According to this study, the pre-school is unable to organise classroom size in accordance with the present regulations. In such a case, the classroom size may be arranged according to the age group or there may be more than one teacher in a class, such as main teacher and assistant teacher. MoNE (2012) has started learning center implementation to use classrooms better. MoNE may study how this is carried out and make it more widespread. Last of all, this study highlights that it is necessary to identify problem behavior as early as possible, and take preventetive and treatment measures. Thus, evidence-based studies having the necessary transition skills may be planned to teach appropriate behavior and social skills to younger groups.

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How Do Pre-service Elementary Teachers Notice Students' Algebraic Way of Thinking in Written Works?

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Abstract: The purpose of this embedded-single case study was to examine pre-service elementary teachers' noticing expertise of students' algebraic thinking in written works considering three skills: attention to students' solutions, interpretation of students' solutions, and deciding how to respond to students' solutions. The participants in this study involved 32 pre-service teachers who were enrolled at an Elementary Teacher Education Program in a public university in Turkey. The data were utilized by pre-service elementary teachers' responses to four students' solutions to a figural pattern task and were analyzed using the framework developed by Jacobs et al. (2010). The analysis indicated although the pre-service teachers could not provide robust evidence of attention and interpretation, they could be able to provide robust evidence of deciding how to respond. Specifically, the percentage of pre-service teachers demonstrating robust evidence was greatest in the skill of deciding how to respond, then interpreting, with attending having the lowest percentage of pre-service teachers demonstrating robust evidence.

Keywords: Algebraic thinking, noticing expertise, pre-service elementary teachers

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Introduction

The National Council of Teachers of Mathematics [NCTM] (2014) states that "Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning" (p. 53). In the same way, Barnhart and van Es (2015) emphasize that effective teachers are able to use students' thinking "to make subsequent pedagogical decisions" (p. 84). Actually, this expertise is called professional noticing and defined as "making sense of how individuals process complex situations" (Jacobs et al., 2010, p. 171). This expertise is a collection of three specific skills which are *attending, interpreting*, and *deciding how to respond*. That is, teachers not only need to attend and interpret students' ideas but also need to decide how to respond to help students improve their mathematical understanding. However, considering the characteristics of a mathematics classroom, it is nearly certain that there would be several ideas students suggest. Without knowing what to attend among the suggested ideas, it is difficult to contribute to students' future success in mathematics (Erickson, 2011; Kilpatrick et al., 2001). To be able to recognize noteworthy or important ideas and use these ideas for the remaining part of instruction, teachers need to have noticing expertise (Jacobs et al., 2010; Star & Strickland, 2008). Furthermore, what teachers notice is foundational for how they act throughout instruction (Schoenfeld, 2011). From this point of view, the purpose of this case study is to examine pre-service elementary teachers' noticing expertise of students' thinking associated with algebra.

Noticing Expertise

Teachers need to actively look and see to be able to notice things that they are not normally aware of (Sherin & Star, 2011). In the same way, Mason (2011) defines noticing as "a collection of practices designed to sensitize oneself so as to notice opportunities in the future in which to act freshly rather than automatically out of habit" (p. 35). These explanations indicate that noticing is not a passive process, but rather an intentional and active process. With this emphasis, researchers have defined teacher noticing in different ways. According to Miller (2011), teacher noticing refers to not only monitoring students while they are working on a task or presenting their ideas but also understanding what pops into these students' minds. Focusing on mathematics teaching, noticing is the ability of a teacher to recognize the mathematical details that emerge while students are engaged in problem-solving activities (Sánchez-Matamoros et al., 2019). That is, teacher noticing is not just determining whether or not the students' answers to problems are correct (Wilson et al., 2013). Instead, it is a specific ability for teachers to notice details that other professions may not notice (Stevens & Hall, 1998). Additionally, points that are noticed by a teacher may be different from the ones noticed by another teacher. To explain a possible reason for this difference, van Es and Sherin (2002) state that noticing expertise is more than identifying noteworthy aspects of instruction. It is also about using their knowledge about the identified aspects to reason about and make connections. Considering its importance, Sherin et al. (2011) accept noticing expertise as one of the core activities of mathematics teaching.

Deciding how to respond was added to the noticing expertise in addition to the skills of attending to and interpreting of students' understandings by Jacobs et al. (2010) in their framework of professional noticing of children's mathematical thinking. The first of these skills, attending, is the extent to which teachers attend to specifics or mathematical essence of children's thinking. Interpreting, the second skill, is the extent to which teachers understand and grasp what children did and why they did (Jacobs et al., 2010). The final skill, deciding how to respond, is about both the extent to which teachers use and benefit from the children's thinking throughout instruction and how teachers' reasoning is consistent with the related literature (Jacobs et al., 2010). There are other researchers who include the skill of responding in their noticing frameworks as well (Erickson, 2011; Santagata et al., 2007). However, these researchers explain that a teacher decides how to respond after they attend to and interpret a student's understanding. Contrary to this statement, to emphasize the relationship among these skills, Jacobs et al. (2010) state that teachers constantly and almost simultaneously consider what their next moves would be. Therefore, for this study, Jacobs et al.'s framework (2010) was used to investigate pre-service elementary teachers' noticing expertise of students' algebraic thinking in written works.

Algebraic Thinking

One of the important and core concepts of mathematics, algebra, is necessary to conceptually and deeply learn and understand mathematics (Blanton & Kaput, 2005). Specifically, Mason (2008) conceptualizes algebra as "a succinct and manipulable language in which to express generality and constraints on that generality" (p. 77). In the same way, algebra is accepted as one of the ways to represent relationships among quantities or formalize these relationships (Chazan, 2000; Kaput, 1999; NCTM, 2000). Usiskin (1988) accepts "algebra as generalized arithmetic" to emphasize the relationship between algebra and arithmetic (p. 11). Furthermore, contrary to the researchers who conceive algebra as the use and manipulation of symbols or letters, Kieran (2004) mentions that students can engage in algebraic activities without using any symbols or letters, which promotes students' algebraic thinking. Actually, Kieran (1992) asserts that using symbols or letters may be really difficult for most of the students. To help students succeed in abstract form of algebra, mathematics programs include algebra starting from early grades (Ministry of National Education [MoNE], 2018; NCTM, 2000). As it can be expected, including algebra in programs is not enough to develop students' abilities to think algebraically. Teachers need to ask their students to use different forms of representations such as drawings and models (Brizuela & Schliemann, 2004). Teachers also need to encourage their students to express their thinking related to figural patterns or communicate mathematically for number sequences (Mason, 2008; Radford & Sabena, 2015). To be able to succeed and hence to make the transition from arithmetic to algebra easier, teachers need to know how to attend to, interpret, and decide how to respond to students' thinking.

By recognizing the importance of teacher noticing in student learning, there have been a number of studies that focused on examining or improving pre/in-service teachers' noticing of students' mathematical thinking in recent years. One of the tools that were used to examine teachers' noticing expertise of students' mathematical thinking was students' written works (Fernández et al., 2013; Goldsmith & Seago, 2011; Ivars et al., 2018; Sánchez-Matamoros et al., 2019). Using students' written works in noticing studies is important as it helps teachers focus on students' mathematical thinking rather than teachers or their pedagogy. Furthermore, students' written works allow teachers to see instruction from students' eyes and consequently support teachers in learning to notice students' mathematical thinking. Throughout this process, teachers carefully consider students' written works and try to interpret how they arrived at their answers, and thereby decide how to respond to them (Stockero, 2014).

There are also studies examining pre-service teachers' noticing expertise of students' algebraic ways of thinking using students' written works. (Callejo & Zapatera, 2017; Magiera et al., 2013; Mouhayar, 2019; Mouhayar & Jurdak, 2013; Simpson & Haltiwanger, 2016). In these studies, the students' written works were supplied by the instructor of the course from the related literature or were hypothetically written by the authors. Contrarily, all the written works used in this study were the real solutions of students to a figural pattern task. Furthermore, students' solutions including different reasoning for algebraic thinking were included in the study to see if these differences affect teachers' noticing expertise. The above-mentioned studies focused on pre-service teachers' attending and interpreting skills of noticing expertise. In addition to these skills, the present study also considered pre-service teachers' deciding how to respond skill of noticing expertise. Since there are not any studies including all three skills of noticing expertise of students' algebraic thinking, the findings reported in this study would expand the noticing literature. Furthermore, the findings of this study would allow researchers or teacher educators to see in which skill(s) pre-service elementary teachers' levels are lower. This study also provides pre-service teachers who will teach in the future with opportunities to be familiar with the real solutions of students. Additionally, the findings would help in-service teachers gain insight into their algebraic thinking and offer significant insights for teachers to be aware of how they can respond to students to improve their algebraic thinking. In parallel with these aims and contributions, the research questions guiding this study were given below:

1. To what extent do pre-service elementary school teachers attend to and interpret students' algebraic thinking in written works?
2. What is the nature of decisions pre-service elementary teachers make to respond to students' algebraic thinking in written works?

Methodology

Research Design

A case study is an in-depth understanding of an issue, a person, or a group of people in a specific context (Creswell, 2007). Besides, a case study does not aim to generalize results, rather it aims to gain insight or improve knowledge about the case by studying it in its own context (Yin, 2009). In this regard, to gain insight into pre-service elementary teachers' noticing expertise of students' algebraic thinking, a case study was used in this study. The case in this study was 32 pre-service elementary teachers, and the context was the Elementary Teacher Education program in the Central Anatolia Region of Turkey. As noted by Yin (2009), a single case study may involve more than one unit of analysis. Although the main unit of analysis was the pre-service elementary teachers' noticing expertise of students' algebraic thinking, the skills of attending to, interpreting, and deciding how to respond were the sub-units of analysis. Therefore, the design employed in this study was an embedded-single case study.

Context and Participants

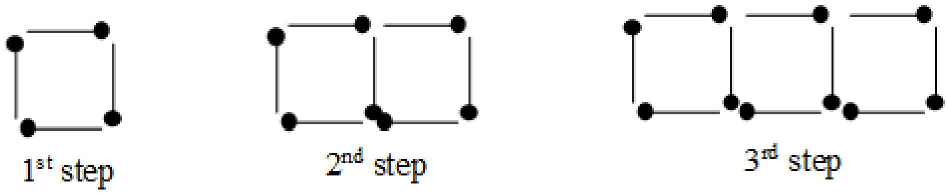
Since this study examined pre-service elementary teachers' noticing expertise of students' algebraic thinking, selecting the cases that met some criteria was important (Creswell, 2007). The criteria for being included in this study were being enrolled in the author's section of Methods of Teaching Mathematics II course and volunteering to be a part of the study. The Methods of Teaching Mathematics II course was the last of three required courses related to mathematics for the pre-service elementary teachers in the Elementary Teacher Education program. This is important as it can be assumed that the pre-service teachers were familiar with instructional methods and strategies, and were aware of importance of students' thinking in mathematics. Therefore, within the Methods of Teaching Mathematics II course, 32 pre-service elementary teachers who agreed to participate were purposefully selected for this study.

Data Collection and Analysis

To examine pre-service elementary teachers' noticing expertise of students' algebraic thinking, students' solutions to a figural pattern task, taken from an existing study (Rivera & Becker, 2003), were used. Students can use different ways to correctly solve the figural task without necessarily finding a general rule. Semi-structured interviews had been designed to gather information about students' solutions to this figural pattern task. The task had been provided to 10 third grade students during the interviews, and the students had been asked to explain their thinking after they solved the task. Throughout the process, to allow the students to clarify how they solved or what they thought, the author had asked some questions such as "Why did you multiply 3 by 22?" "Why did you subtract 24 from 100?" or "How did you conclude that the 24th step would be 80?" These questions were also important for preventing the author from misinterpreting the students' solutions. Furthermore, before conducting the interviews, the task had been shared with two mathematics educators to decide whether or not the task had been appropriate for the purpose. After applying the task to the elementary students, four of the students' solutions that included important details for algebraic thinking were selected for the pre-service teachers. The students' solutions also differed in considering their accuracy and ways of reasoning. This issue is important as Jacobs et al. (2010) emphasize that teachers' attention, interpretation, and responses, which constitute the noticing expertise, can differ according to correctness or incorrectness of solutions. In the same way, students' understandings of a concept are mostly reflected in their strategies used to solve a task (Jacobs et al., 2010). That is the task and the students' solutions were strategically selected for the current study. The task and the students' solutions were given below:

Figure 1.

The Task and The Students' Solutions to The Task

<table>
<tr><th colspan="4">The Task</th></tr>
<tr><td colspan="4">In the figures below, the first three of the steps of a pattern formed by using matchsticks were given.


According to the steps, find the total number of matchsticks in the 25th step.</td></tr>
<tr><th colspan="4">The Solutions Given to the Task</th></tr>
<tr><th>Student A</th><th>Student B</th><th>Student C</th><th>Student D</th></tr>
<tr><td>4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, 73, 76

76 matchsticks will be used in the 25th step.</td><td>22×3=66

10+66=76

In the 25th step, there will be 76 matchsticks.</td><td>25×3=100

100 – 24=76

76 matchsticks in the 25th step.</td><td>3rd step: 10

24th step: 80

1st step: 4

84 matchsticks in the 25th step.</td></tr>
</table>

The pre-service teachers were each given four student solutions to analyze and were asked to explore how each student solved the task through the questions. Specifically, the questions included "(1) Determine whether each of the student's way of thinking is true or false. Explain how you have decided the correctness of each student's way of thinking by providing evidence from the student's solution. (2) Explain how each student has solved the task considering the student's solution. Explain what each student knows and does not know about algebraic thinking considering the student's solution. (3) If you were the teacher, how would you respond to each student?" This process was also piloted with ten pre-service elementary teachers who were enrolled in the other section of the Methods of Teaching Mathematics II course and not the participants of the current study.

To make meaning out of the pre-service elementary teachers' responses to the above-given questions, first of all, a coding schema described in Jacobs et al.'s framework of professional noticing of children's mathematical thinking (2010) was adapted for this study. Merriam (2009) states that data analysis is the process of "consolidating, reducing, and interpreting what people have said and making meaning out of it" (p. 176). By means of the schema, a level for each pre-service elementary teacher's response for each skill of attending, interpreting, and deciding how to respond was examined. Specifically, the noticing levels of each of the skills of the noticing expertise and the description of these levels were detailed in Table 1 below.

Table 1.

The Coding Schema for Analysis of Noticing Level of Attending, Interpreting, and Deciding How to Respond to Skill

Skill of Noticing Expertise	Noticing Level	Description of Level
Attending	Robust Evidence	• Identifying whether or not the solutions are correct by providing mathematical details for the solutions. • Providing specific evidence from the student's solution.
	Limited Evidence	• Identifying whether or not the solutions are correct by providing general statements for the solutions.
	Lack of Evidence	• Identifying the solutions incorrectly.
Interpreting	Robust Evidence	• Interpreting mathematical details of the solution. • Providing specific evidence about how the student thinks. • Recognizing what the student knows or does not know.
	Limited Evidence	• Interpreting the student's solution correctly but with less depth or with general statements. • Making relevant connections to the student's solution but without going beyond the solution provided.
	Lack of Evidence	• Interpreting the student's solution incorrectly. • Providing wrong evidence about how the student thinks. • Not providing any evidence of the student's understanding. (Not providing specifics about how the student was thinking.) • Making irrelevant connections to the student's solution.
Deciding how to respond to	Robust Evidence	• Asking another problem to invite the student to use another strategy in addition to the used strategy. • Asking a question to extend the student's understanding. • Providing another solution to help the student discover that the task can be solved in a different way.
	Limited Evidence	• Asking questions to understand the student's thinking.

		• Responding to the student with building on the student's understanding but with less depth or with general statements. • Offering similar future steps for the students whose solutions are different from each other.
	Lack of Evidence	• Appreciating the student. • Responding to the student without building on the student's understanding. • Asking a similar problem with different wording to make the student practice. • Changing the numbers given in the problem to make it more difficult. • Providing unrelated responses as if the student's solution was not examined.

Based on the coding schema given above, the pre-service elementary teachers' responses for each noticing expertise skill were coded under three levels of noticing: robust, limited, and lack of evidence similar to that of LaRochelle et al. (2019). To be able to easily and correctly code these levels, some key terms for each level of the skill of the noticing expertise were identified. Specifically, for the skill of attending, the mathematical details within each student's solution were identified in addition to the correctness of each student's solution. That is, identifying the student's solutions as correct or not correct was not enough to be coded under robust evidence. The pre-service teachers also needed to provide mathematical details within and specific evidence from the student's solution to be coded under robust evidence. If the pre-service teachers identified the correctness of each student's solution but described each of them in a short way, their responses, then, were coded under limited evidence. Contrary to the above-mentioned two levels, the pre-service teachers whose responses were coded under lack of evidence could not identify the correctness of each student's solution.

For the interpreting skill, making sense of the student's solution to be able to explain why the student solved the task in that way or what the student did not know was necessary to be coded as robust evidence. The responses that include connections without going beyond or redescription of the students' solutions are coded as limited evidence. If the pre-service teachers could not interpret students' solutions correctly, could not provide correct evidence about how the students think, or did make irrelevant connections to the students' solutions, then their responses were coded under lack of evidence.

Lastly, for the skill of deciding how to respond, the responses trying to extend the student's understanding were coded as robust evidence. In the responses with limited evidence, the pre-service teachers asked questions to understand what the students think or responded to the students without aiming to extend their understanding. Finally, the responses in which the pre-service teachers just appreciated the students, provided unrelated responses to the students, or asked similar problems with different wording were placed under lack of evidence. Throughout this process, the evidence from the pre-service elementary teachers' statements were also noted to make the question of why their responses were coded under this level clear.

To ensure the trustworthiness of the study, thick description of the pre-service teachers, the task, the students' solutions to the task, and the data collection and analysis process were provided. Additionally, the author and a mathematics educator separately coded the pre-service teachers' responses to three questions provided above in terms of the noticings levels. Throughout this process, if any discrepancy exists among the coders, it was discussed until reaching a consensus. Having a mathematics educator having expertise and experience in teacher noticing to code the pre-service teachers' responses ensured the reliability of the study. The inter-rater reliability was calculated at 90% or higher. Furthermore, direct quotations from the pre-service teachers' responses to the students' solutions were included. Throughout this process, their explanations were reviewed repeatedly to reduce any inaccuracies or misinterpretations.

Findings

Since this study examined the pre-service elementary teachers' noticing expertise of students' algebraic thinking considering the specific skills: attending, interpreting, and deciding how to respond, the findings were presented in three parts. Throughout these three parts, the frequency of the noticing levels of the skills, as well as the excerpts from the pre-service teachers' papers, were provided.

Skill of Attending to Students' Algebraic Thinking

Table 2 shows the overall frequency of each pre-service elementary teacher's response coded as robust, limited, or lack of evidence among the four students' solutions.

Table 2.

The Frequency and Percentage of Pre-service Elementary Teachers' Responses for Each Level of Attending Skill for Each Student

Students / Level	Student A	Student B	Student C	Student D	Total
Robust Evidence	7 (21.88%)	6 (18.75%)	7 (21.88%)	7 (21.88%)	27 (21.09%)
Limited Evidence	25 (78.12%)	16 (50%)	22 (68.75%)	25 (78.12%)	88 (68.75%)
Lack of Evidence	0	10 (31.25%)	3 (9.37%)	0	13 (10.16%)

N=32
*The solutions of Student A, Student B, and Student C are correct; the solution of Student D is not correct.

As shown by Table 2, all pre-service elementary teachers were able to demonstrate at least limited evidence of attending to the solutions of Student A and Student D. In addition, the analysis of the pre-service elementary teachers' responses revealed that

21.88% of them demonstrated robust evidence of attending to these two students. This finding is important because Student A's solution is correct, while Student D's solution is not correct. A closer look at these responses showed that the pre-service elementary teachers did not just describe the solutions of Student A and Student D; they also provided mathematical details and specific evidence from their solutions regardless of the solutions' correctness. Below is an excerpt from a pre-service elementary teacher's response about Student A's solution:

> The student correctly found the number of matchsticks that would be used in the twenty-fifth step by adding three to the number of matchsticks in the previous step one by one. I mean, s/he wrote it as 13, 16, 19, … 70, 73, 76 for the fourth, fifth, sixth, … twenty-third, twenty-fourth, and twenty-fifth step, respectively. That is, the student just listed the numbers by increasing the number of matchsticks by three in each step without making a generalization. (PST12)

Similarly, the following response given by PST1 for Student D is an example of robust evidence of attention:

> The student counted the number of matchsticks in the third step and wrote it as 10. Then, the question asks the number of matchsticks in the twenty-fifth step. So, the student thought that if s/he multiplies the third step by 8 to find the twenty-fourth step, s/he has to multiply the number of matchsticks in the third step by 8 which is equal to 80 matchsticks. Then, s/he added the number of matchsticks in the first step, 4, to 80, and found the number of matchsticks in the twenty-fifth step as 84. However, the student did not consider that some of the matchsticks in this solution were counted more than once. Therefore, the student's solution is wrong.

Table 2 also shows that there were six pre-service teachers who demonstrated robust evidence of attention to Student B, and seven pre-service teachers for Student C. One of the responses provided for Student B is presented below:

> Instead of adding 3 each time to find the next step and writing 13, 16, 19, … until the twenty-fifth step similar to Student A, s/he multiplied 22 by 3 and found the number of matchsticks as 66. Actually, the student found how many matchsticks would increase until the twenty-fifth step. However, there were 10 more matchsticks in the third step. So, the student added these two numbers and found 76. The student's reasoning is correct. (PST20)

Another example of robust evidence of attention was provided by PST7 to Student C's solution. The following excerpt demonstrates how PST7 attended to the solution.

> Student C identified that the step number was equal to the number of squares. Therefore, s/he multiplied 25 by 4 as each square has four equal sides, matchsticks in this task. However, s/he also noticed that there were common matchsticks. That is, for example, there was 1 common matchstick in the second step; were two matchsticks in the third step, and would be 24 common matchsticks in the twenty-fifth step. Therefore, s/he subtracted 24 from 100 and concluded that for the twenty-fifth step, there would be 76 matchsticks which is correct.

As can be seen from the above responses demonstrating robust evidence of attention, these pre-service teachers were able to explain in detail how Student A, Student B, and Student C correctly found the total number of matchsticks in the twenty-fifth step, and why Student D's solution was not correct.

On the other hand, there were also some others who could not correctly attend to the solutions of Student B and Student C. There were differences in the percentage of pre-service elementary teachers who demonstrated robust, limited, and lack of evidence of attending to the solutions of Student B and Student C. Specifically, the analysis of the pre-service elementary teachers' responses revealed that they were able to attend to Student B's solution 18.75% with a robust, 50% with a limited, and with 31.25% with a lack of evidence. Similarly, 21.88% of the pre-service elementary teachers demonstrated robust evidence of attending to Student C's solution compared to 78.12% of the pre-service elementary teachers who demonstrated limited or lack of evidence of attending. The percentage of pre-service elementary teachers who demonstrated lack of evidence of attending was higher for Student B compared to the other students. To be more specific, these pre-service elementary teachers could not even find out Student B's solution's correctness. Therefore, they could not correctly attend to and report what Student B did to find the number of matchsticks in the twenty-fifth step. As an example, PST16's response to Student B is given below:

> I could not understand how Student B solved the task.

In the same way, the following excerpts taken from the pre-service elementary teachers' responses are the examples of lack of evidence of attending to Student B's solution:

> The student might have counted the total number of matchsticks in the first, second, and third steps, and found as 22 instead of 21. Since the student discovered that the number of matchsticks increases by 3 between the consecutive steps, s/he multiplied 22 by 3 and found 66. Then, s/he added the number of matchsticks in the third step, 10, to 66, and found 76. However, the student accidentally counted the total number of matchsticks in the first three steps, the solution is not correct. (PST5)

> The first, second, and third steps were given in the task. The student identified the difference between the consecutive steps was 3 and concluded that it would increase by 3. So, s/he thought that s/he had to multiply 22 (the difference between the twenty-fifth and the third steps) by 3. However, I could not understand where the number 10 came from or why the student added 10 to 66. I think the student added these numbers just to find 76. So, the student's solution is wrong. (PST14)

Just as the previous excerpts indicated, all of the pre-service elementary teachers who demonstrated lack of evidence of attention stated that the solution of Student B was incorrect, although Student B correctly solved the task in a different way compared to Student A and Student C. Additionally, three pre-service elementary teachers whose responses were coded as lack of evidence could not provide any explanation for the solution of Student C.

Skill of Interpreting Students' Algebraic Thinking

The overall frequency of each pre-service elementary teacher's response coded as robust, limited, or lack of evidence of interpreting among the four students' solutions is provided in Table 3 below.

Table 3.

The Frequency and Percentage of Pre-service Elementary Teachers' Responses for Each Level of Interpreting Skill for Each Student

Students / Level	Student A	Student B	Student C	Student D	Total
Robust Evidence	12 (37.5%)	5 (15.62%)	6 (18.75%)	10 (31.25%)	33 (25.78%)
Limited Evidence	17 (53.13%)	14 (43.75%)	18 (56.25%)	17 (53.13%)	66 (51.56%)
Lack of Evidence	3 (9.37%)	13 (40.62%)	8 (25%)	5 (15.62%)	29 (22.66%)

N=32
*The solutions of Student A, Student B, and Student C are correct; the solution of Student D is not correct.

As displayed above in Table 3, more than 30% of the pre-service elementary teachers provided robust evidence of interpretation for Student A and Student D. As mentioned in the skill of attending to students' algebraic thinking part of this paper, while the solution of Student A is correct, the one of Student D is not correct. Although there is a slight difference between the percentage of pre-service elementary teachers' responses for Student A and Student D, it can be stated that these pre-service teachers interpreted both correct and incorrect solutions with robust evidence. One of the responses demonstrating robust evidence of interpretation of Student A's solution is presented below:

> The student discovered that the pattern in the task can be written as a number pattern that increases by three starting from four. However, the student may not know how to find a rule relating the number of matchsticks to the step number. I mean, when we ask him/her to explain the pattern, s/he would probably be able to explain that the number of matchsticks increases three by three in each step and count in threes until the twenty-fifth step. Although the student could correctly count, s/he could not make a generalization. (PST4)

Another example of robust evidence of interpretation provided by PST19 for Student D is as follows:

> The student's solution is interesting compared to the other students' solutions. The student accepted the number of matchsticks in the third step as a unit and calculated the multiples of this unit to find the number of matchsticks in the twenty-fifth step. Although the student started with his/her solution with correct reasoning, s/he did forget or did not consider that some of the matchsticks in the figures were common. Therefore, when the unit, 10 in his/her solution, was multiplied by 8, some of the matchsticks were counted more than once. If s/he had found the number of common matchsticks and subtracted this number in the final step of his/her solution, then the solution would have been correct.

As provided in Table 3, less than 20% of the pre-service elementary teachers provided robust evidence of interpretation for Student B and Student C as well. Below the excerpts are examples of the responses including robust evidence of interpretation for Student B and Student C, respectively.

> The student recognized that the number of matchsticks starts from 4 and grows by adding 3 step by step. S/he also discovered that s/he needs to add 3 for 22 times. Therefore, instead

> of adding three by three, s/he thought that the task can be solved by multiplication as s/he knew that multiplication could be used for repeated addition. (PST11)

> The student saw the task as a figural pattern task and recognized that the matchsticks form squares in each step. Therefore, s/he accepted each step of the pattern as if it consisted of squares. She found the total number of matchsticks in the twenty-fifth step using these squares. Furthermore, s/he identified that there would be 24 common matchsticks in the twenty-fifth step. I mean, she did not forget to subtract the number of common matchsticks. (PST6)

As understood from these excerpts, the pre-service teachers whose responses coded as having robust evidence of interpretation were able to make sense of students' solutions with reasoning by providing specific evidence from their solutions.

Contrary to the responses demonstrating robust evidence of interpretation of the solutions of Student A and Student D, there were also responses coded as lack of evidence of interpretation. Specifically, these responses did not include any evidence of how Student A or Student D thought in the solution process or did make irrelevant connections to Student A's or Student D's solutions. Two of the examples of interpretation with lack of evidence for Student A and Student D, respectively, are given below:

> The student needed to write to correctly find the number of matchsticks in the twenty-fifth step. (PST9)

> The student could not solve the task correctly. (PST30)

Moreover, the number and percentage of the responses demonstrating lack of evidence of interpretation were higher for the solutions of Student B and Student C than the ones of Student A and Student D. Specifically, while the percentage of pre-service teachers' interpretation with lack of evidence for Student B is 40.62%, the percentage is 25% for Student C. These pre-service teachers did not or could not correctly interpret Student B's and Student C's thinking reflected in their solutions. Furthermore, some of the pre-service teachers' interpretations were not relevant to these students' solutions. For a more specific example of how these pre-service teachers interpreted Student B's solution, PST13 stated:

> The student multiplied 22 by 3 and added 10 to the result to find 76 as an answer. The total number of the matchsticks in the twenty-fifth step is 76 right; however, the student accidentally found this number. I mean, there is not logic underlying the solution. Instead, that is, if s/he could not solve the task by finding a rule, step by step, s/he could have written the total number of matchsticks in each step similar to Student A.

The below excerpt is an example of the response demonstrating lack of evidence of interpretation of Student C's solution.

> At first, I was surprised by the student's solution as s/he wanted to look at the pattern different than the other students; however, s/he could not succeed. After the student found 100 as a result for the multiplication of 25 by 4, s/he should have subtracted the total number of matchsticks in the first three steps which was 21 from 100 to correctly find the result. (PST10)

Clearly seen from the above excerpts, either because of the pre-service elementary teachers provided little to no evidence from the students' solutions or their lack of making relevant connections, their responses were coded as lack of evidence of interpretation.

Skill of Deciding How to Respond to Students' Algebraic Thinking

Table 4 provides the overall frequency of each pre-service elementary teacher's response coded as robust, limited, or lack of evidence of deciding how to respond to the four students' solutions.

Table 4.

The Frequency and Percentage of Pre-service Elementary Teachers' Responses for Each Level of Deciding How to Respond Skill for Each Student

Level \ Students	Student A	Student B	Student C	Student D	Total
Robust Evidence	12 (37.5%)	4 (12.5%)	3 (9.37%)	16 (50%)	35 (27.34%)
Limited Evidence	13 (40.62%)	9 (28.13%)	8 (25%)	10 (31.25%)	40 (31.25%)
Lack of Evidence	7 (21.88%)	19 (59.37%)	21 (65.63%)	6 (18.75%)	53 (41.41%)

N=32
*The solutions of Student A, Student B, and Student C are correct; the solution of Student D is not correct.

As indicated in Table 4, all of the pre-service teachers provided a response to each student; however, they did it at different levels. Specifically, the percentage of pre-service teachers who demonstrated robust evidence is higher for Student A and Student D rather than for Student B and Student C. More specifically, among the four student solutions, the percentage of the responses at the robust level is the highest for Student D's solution. This finding means that the pre-service teachers decided to respond to the student with an incorrect solution at a more robust level compared to the students with correct solutions. To better exemplify the details of the responses at the robust level provided for Student D, an example of them is given below:

> The student has difficulty in recognizing that the adjacent edges of the squares are common. Therefore, instead of directly making this explanation to the student, I would ask questions such as "Can you find the number of matchsticks in the third step by counting?" "How many matchsticks are there in the third step using your rule?" "How many matchsticks will be in the fourth step using your rule?" "Can you draw the figure for the fourth step and check it if your answer is correct? "Can you compare the results that you found by counting and by your rule?" "What may be the reason for this difference?" By means of these questions, I can help the student recognize why his/her solution is not correct. Furthermore, I can understand how s/he solved the task or what s/he thought while solving the task. According to his/her answers, I would ask other questions to direct the student to discover other ways to find the number of matchsticks in the twenty-fifth step. (PST15)

Another example of a response at the robust evidence was provided by PST8 for Student A. PST8 wrote the following in response to how would you respond to Student A to help him to notice the points he did not know:

> I would tell him "you found the number of the matchsticks in the twenty-fifth step by adding threes like 4, 7, 10,… Your answer is correct". Then, I would ask the question of "How many matchsticks will be in the hundredth step?" or "Can you find the number of matchsticks in the thousandth step by counting?" I try to help him feel that it would be a waste of time if he counted similar to the way that he did. I would tell him to examine a relationship between the step number and the number of matchsticks in that step to easily find the number of matchsticks in any step. I do not know the student's level, but I may try to show the student how s/he can use the t-table to solve pattern tasks.

While 12.5% of the pre-service teachers responded at the robust level to Student B, 9.37% of them responded at the robust level to Student C. One of the four responses provided for Student B is given below:

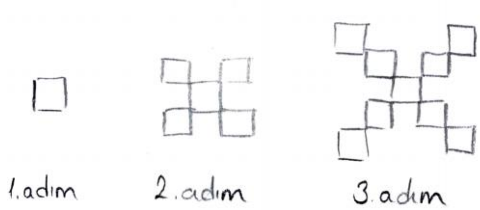
> I would ask the student why s/he specifically takes the third step into consideration. If I correctly understood the solution, s/he thought that since there were twenty-two steps until the twenty-fifth step, s/he had to multiply twenty-two by three and the number of matchsticks in the third step to find the number of matchsticks in the twenty-fifth step. I would ask him/her if he can take the second step into consideration and find the same result. If my understanding is correct, the student will say that there were twenty-three steps between the second and twenty-fifth steps. Then, s/he will multiply twenty-three by three and find 69, and finally, s/he will add 7, the number of matchsticks in the second step to 69 to find 76, the number of matchsticks in the twenty-fifth step. By means of this solution, s/he will recognize that s/he does not have to take the last step given in the task. Furthermore, I do not know how s/he noticed the pattern increases by three. I mean, "Did the student write as a number pattern like Student A?" or "Did he focus on the pieces of the figures in each step?" If he focused on the pieces, I would ask some questions to lead him to consider other pieces so that s/he can solve the task in a different way. (PST19)

Below is another example in the same level, robust evidence, excerpted from PST13's response for Student C:

> I would tell the student that "You saw that each step consisted of squares and the number of squares in each step is the same as the number of steps. Therefore, you multiplied 25 by 4 and found 100. Can you explain why you subtracted 24 from 100?" Actually, I know that the student subtracted 24 as he counted 24 matchsticks twice; however, I would like to listen his/her reasoning. If s/he indicates that s/he subtracted the common matchsticks, then I can ask the question of "How would the figures in each step be like, there would not be any common matchsticks, or you would not need to subtract the common matchsticks?" I really wonder if s/he can draw such a pattern. But, if s/he cannot draw, I would draw the below figure and help him to see the difference between the pattern given in the task and the pattern given below.

Figure 2.

The figural pattern task asked by PST13



As indicated in the above excerpts, the pre-service elementary teachers who demonstrated robust evidence first referred to the students' solutions and understanding by providing direct evidence from their solutions. Then, they asked questions to extend their understanding or to help them use other strategies to solve the same task.

Contrary to the pre-service teachers whose responses were at the robust level, there were also pre-service teachers who responded to the students with the lack of evidence level. As evidenced in Table 4, nearly 20% of the responses for Student A and Student D were at the lack of evidence level. Specifically, the responses provided for Student D were similar to the excerpt below in that the pre-service teachers explained that although they knew the solution of Student D was not correct, they did not know where the error was. One of these responses is as follows:

> I could not identify the step in which the student made an error. Therefore, I may ask the student to check his/her steps. (PST2)

The percentage of the responses at the lack of evidence level was much higher for Student B and Student C with 59.37% and 65.63%, respectively. The reason for these high percentages is that the pre-service teachers just appreciated the students whose solutions were correct. The followings are three sample responses provided for Student A, Student B, and Student C, respectively.

> Good job. (PST1)
>
> Your solution is correct. (PST17)
>
> You correctly found the result. I appreciate you. (PST22)

As can be understood from these excerpts, the pre-service teachers whose responses at the lack of evidence level did not consider the students' algebraic thinking; and hence, did not provide different responses to them despite the differences in their reasoning.

Discussion, Conclusion, and Suggestions

This study examined the nature of pre-service elementary teachers' noticing expertise of students' algebraic thinking in written works. Considering the purposes of this study, noticing expertise included three skills described by Jacobs et al. (2010): (1) attending, (2), interpreting, and (3) deciding how to respond. Focusing on these skills separately enabled the author to determine the skills in which pre-service elementary teachers could or not be able to demonstrate robust evidence.

With respect to the first skill of noticing expertise, the findings indicated that more than half of the pre-service teachers attending at a limited level made correct judgments for all of the students' solutions. This finding is similar to those of other researchers who explained that pre/in-service teachers were good at attending to students' solutions (Callejo & Zapatera, 2017; LaRochelle et al., 2019; Sánchez-Matamoros et al., 2019). However, nearly 20% of the pre-service teachers were able to attend to the students' solutions at robust level. That is, only these teachers justified their reasons and supported their justifications with mathematical details from the students' solutions. Most of the pre-service teachers in this study had difficulties in providing evidence from the students' solutions similar to the related studies (Jacobs et al., 2010; Goldsmith & Seago, 2011). The reason for this difficulty might result from the pre-service teachers not knowing what was mathematically important in the students' solutions (Schoenfeld, 2011; Sherin, 2007). In the same way, Star and Strickland (2008) emphasize that teachers may not be able to attend to students' solutions because of their lack of mathematical knowledge. Therefore, it can be concluded that the pre-service teachers demonstrating limited evidence of attention may have some limitations in their mathematical knowledge which has an impact on their noticing skills.

In addition, the percentage of pre-service teachers who provided robust evidence was nearly equal for all of the students which means that they were able to attend regardless of the correctness of these students' solutions. On the other hand, there was a difference among the percentage of pre-service teachers who demonstrated lack of evidence for the students whose solutions were correct. The responses demonstrating lack of evidence of attention were actually only provided for two out of three correct solutions: the solutions of Student B and Student C. This finding is not entirely surprising despite the fact that pre-service teachers attend to students' solutions regardless of these solutions' correctness (Jacobs et al., 2010). To be more specific, Mouhayar (2019) explains that teachers' level of attention differs according to the students' strategies and solutions. Furthermore, being familiar with these strategies or solutions has an effect on the level of teachers' attention (Goldsmith & Seago, 2011). Considering these explanations, it might be stated that the pre-service teachers who provided lack of evidence of attention were not familiar with the solutions provided by Student B and Student C.

Similarly, most of the responses demonstrating lack of evidence of interpretation were provided for the same two students. Additionally, the percentages of these responses were greater than the percentages of the responses demonstrating lack of evidence of attention. Consistent with previous studies (Barnhart & van Es, 2015; Goldsmith & Seago, 2011; Sánchez-Matamoros et al., 2019), this means that although some of the pre-service teachers identified the correctness, they could not correctly interpret or could make irrelevant interpretations of Student B's and Student C's solutions. Barnhart and van Es (2015) explain that pre-service teachers with lack of teaching experience have difficulties in interpreting students' mathematical thinking. Moreover, such kind of interpretations might even be challenging for experienced teachers (Little & Curry, 2008). Considering that the pre-service teachers in this study had no experience in a real classroom environment, it might be concluded that the increase in the number of responses demonstrating lack of evidence of interpretation is not surprising.

Strikingly, in contrast to this finding, there were also pre-service teachers who provided robust evidence of interpretation of the solutions of Student A and Student D, although they could not attend to their solutions with robust evidence. More specifically, these pre-service teachers were able to interpret mathematical details of their solutions and recognize what Student A knew or what Student D did not know. Although the attending skill is accepted as foundational for the interpreting skill, Barnhart and van Es (2015) state that robust evidence of attention does not assure robust evidence of interpretation. Considering the findings of this study, it can also be stated that the limited level of attention does not inhibit the robust level of interpretation. The reason for this difference may result from encouraging teachers to interpret these students' solutions by asking questions such as "Explain how each student has solved the task considering the student's solution." and "Explain what each student knows and does not know about algebraic thinking considering the student's solution." That is, when the pre-service teachers were given these questions, they might have considered how Student A or Student D thought throughout the solution or what the reasoning underlying their solutions could be. Therefore, this finding extends the related literature by showing that the level of a teacher's interpretation can be greater than that of a teacher's attention.

Considering the skill of deciding how to respond, there were differences in the percentage of pre-service teachers who provided robust evidence for the students. Specifically, the percentage of these pre-service teachers was the greatest for Student D whose solution was not correct. Researchers emphasize that teachers have more difficulties in effectively responding to students with incorrect solutions (Son & Crespo, 2009). Although responding with robust evidence may be difficult for pre-service teachers as it requires understanding the child's way of thinking (Ginsburg, 1997), they can succeed this process by asking questions to help the child explain his/her strategy or thinking. By means of these questions, they can discover the child's error(s) and hence extend the child's understanding (Jacobs & Ambrose, 2008). Like the case in the previous study, the pre-service teachers responding with robust evidence tried to extend the understanding of Student D after identifying why the solution of Student D was wrong. Wager (2014) emphasizes that not providing opportunities for students to explain their strategies or simply replying as wrong answer may result in students shut down. Since the pre-service teachers in this study did not directly provide Student D with the correct answer, it can be concluded that the pre-service teachers' responses would not result in shutdown of Student D.

Contrary to the responses extending the student's understanding, most of the responses provided for the students with correct solutions were in the level of lack of evidence of deciding how to respond. These responses did not differ for the students despite the differences in their solutions. Specifically, the pre-service teachers who demonstrated lack of evidence just appreciated the students for their correct solutions. Actually, this finding is similar to that of Crespo (2002) who explains that appreciating or praising a student is usually accepted sufficient for a correct solution. In the same way, Milewski and Strickland (2016) state that teachers reflexively respond to these students "move on, praise, or affirm the answer" (p. 128). However, NCTM (2000) emphasizes that teachers need to provide responses more than "right or wrong" (p. 24). Jacobs and Ambrose (2008) explain the answer to why teachers need to go beyond by stating that "important learning can occur after a correct answer is given when a child is asked to articulate, reflect on, and build on initial strategies" (p. 266). With respect to this emphasis and explanation, it can be stated that appreciation of a student's solution is absolutely important, however, it needs to be followed by specific and different responses to the student to extend not only understanding of this student but also that of other students.

In short, when the percentages of pre-service teachers providing robust evidence were compared considering the skill of noticing expertise, it was found that the percentage was the greatest for the skill of deciding how to respond. Then, it was greater for the interpreting skill, and followed by the attending skill with the lowest percentage. The distribution of these percentages shows that although the pre-service teachers could not provide robust evidence of attention or interpretation, they could be able to provide robust evidence of deciding how to respond. Despite the researchers who emphasize that attending is a foundational skill for the two other skills of noticing expertise (Jacobs et al., 2010; Jacobs et al., 2011; LaRochelle et al., 2019; Mouhayar, 2019), this study revealed that the pre-service teachers' skills of interpretation and deciding how to respond were not affected by their skills of attending. A similar study might be conducted to see if the findings would be similar to those of this study. If not, the possible reasons for this difference might be further explored.

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Sixth Grade Students' Some Difficulties and Misconceptions on Angle Concept

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Abstract: This study aims to determine the misconceptions and difficulties of sixth-grade students on the subject of angles. The study participants are 25 sixth grade students from a public school in a city in western Turkey during the 2017-2018 academic year. This qualitative study used 17 open-ended questions designed by the researchers for data collection to examine the students' misconceptions and difficulties. Data were examined by implementing content analysis. It has been analysed that students cannot define the angle due to difficulties and misconceptions in determining the corners and edges of a symbol. Besides, they also find it difficult to compare the measures of the angles, adjacent angles, complementary and supplementary angles.

Keywords: Angle concept, misconception, student difficulties

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Introduction

The concept is defined as "the general design encompassing the common features of objects or events and consolidate them under a common name" (Turkish Language Association, 2018) in mathematics. The concept can become more meaningful by seeing the relationships and transitions among other concepts in addition to merely recognizing and knowing them (Baki, 2015). Besides, the concepts are interrelated in mathematics, and the students act on the inferences by attaching different meanings to a concept. Such unconscious mistakes in the learning process can create misconceptions (Turkdoğan et al., 2015).

A misconception is expressed as a person's interpretation of a subject that makes sense to self yet in a way that contradicts the conceptual understanding of experts in that field (Baki, 2015). Misconception should be considered as producing an incorrect answer due to an error or lack of knowledge and a developed perception or conception that is diverged from expert opinion (Hammer, 1996) that causes systematic errors (Smith III et al., 1993). Misconceptions are accepted as unconscious behaviours of students with no mathematical validity, resulting from false beliefs and experiences (Baki, 2015). If students confidently explain why their mistakes are correct, it can be said that there is a misconception and it is challenging to address these misconceptions (Yenilmez & Yasa, 2008). This difficulty stems from the fact that deeply rooted misconceptions and the obstacle to conceptual understanding (Minstrell, 1982) are supported by the experiences of individuals; thus, they constantly resist change (Cox & Mouw, 1992). Considering the interconnected nature of mathematics, having misconceptions about prior knowledge could lead to inaccurate learning for students and more deeply rooted misconceptions (Baki, 2015; Driver & Easley, 1978; Sandir et al., 2007; Woodward et al., 1994). Misconceptions are expressed as incorrect meanings based on misunderstandings and misinterpretations (Ojose, 2015) and should not be addressed only within student failure and errors (Graeber & Johnson, 1991). Also, the teaching method used could be influential in forming misconceptions (Zembat, 2010). It is natural to experience misunderstanding in mathematics; therefore, possible misconceptions about concepts must be noted so that methods to remediate such misconceptions can be developed to avoid persistence (Ojose, 2015). The necessity of providing comprehensive mathematical concept knowledge for conceptual learning has made it valuable to seek solutions to identify and remediate misconceptions and address the lack of knowledge (Kucuk & Demir, 2009). Majority of educational studies are focusing on the identifying students' lack of knowledge and efforts to address them (Akbulut & İsik, 2005; Akkaya & Durmus, 2006; Ay, 2017; Ayyildiz & Altun, 2013; Basturk & Donmez, 2011; Keceli & Turanli, 2013; Simon, 2006; Ojose, 2015; Temel & Eroglu, 2014; Turkdogan, Guler et al., 2015; Turnuklu et al., 2013; Yenilmez & Uysal, 2007). This study also aimed to identify sixth-grade students' difficulties and misconceptions about angles.

Conceptual Analysis of Studies on Student Difficulties and Misconceptions About Angles

Geometry is an essential component of mathematics education students find difficult to understand (Van Hiele, 1986). Understanding the fundamental geometric concept of angle is essential for learning about this component from an early stage (French, 2004). However, the angle is one of the oldest and fundamental concepts in which students lack knowledge and misconceptions. Of basic geometry concepts, it is identified as one of the most abstract and the most challenging concepts for students (Tanguay & Venant, 2016). This undesirable situation makes it difficult to advance in other subjects of geometry (Moore, 2013). Studies on the difficulties and misconceptions related to angles were reviewed to identify their common aspects and document reported misconceptions (see Table 1). "Angle definition and types", "angle construction", "notation of an angle with the symbol", "angle measure", "adjacent, complementary, supplementary and opposite angles" and "constructing a perpendicular line from a point on the line or not on the line" categories were used to classify the errors and misconceptions based on this review.

Table 1.

Misconceptions about Angles in the Literature

Errors and Misconceptions	Researchers
Related to Angle Definition and Types:	
• Not being able to define, not having a sufficient language to define, difficulty in expressing it verbally, • Reference to the "corner" of a physical object or geometric shape, • Emphasis on "measure" in angle definition, • Expressions including types of angles • Not recognizing the right angle when its edges are not parallel to the edges of the paper, • Obtuse angles are not seen as an angle, • Straight angles are not noticed, • Definitions were usually incorporating expressions that are visually formed in the minds and include other geometric concepts such as "The distance between the sides of a polygon; The distance between two intersecting lines; The measure between two points starting from common endpoint; The degree between the rays of two intersecting line segments; A ray extending along a straight line; It is a unit of measure."	*Baldy et al. (2005), Butuner & Filiz (2017), Cetin & Dane (2004), Dane & Baskurt (2011), Doyuran (2014), Erbay (2016), Keiser (2004), Kilic, Temel & Senol (2015), Taylan & Aydin (2017), Yesildere (2007).*
Related to Angle construction:	
• The obvious superiority of the right angle as a prototype and the learning obstacle, • Representing the vertex of a physical object or geometric figure and its effect in drawings • One edge of the angle must be horizontal.	*Baldy et al (2005), Devichi & Munier (2013), Doyuran (2014), Mitchelmore (1998).*

Related to notation of an angle with symbol: • $Notations\ \ such\ as\ \widehat{AB}, AB, ABC, (\widehat{ABC})$	Doyuran (2014)
Related to Angle Measure: • It depends on the size of the shaded interior region, • Depends on the length of the arc (or radius of the arc) pointing to the angle, • It depends on the length of the edges and there may be a right-angle effect in this misconception, • Congruent angles with different orientation or edge lengths are different angles.	Butuner & Filiz (2017), Devichi & Munier (2013) Keiser (2004), Mitchelmore (1998).
Adjacent, Complementary, Supplementary and Opposite Angles: Insufficiency in defining these angles • Inability to identify these angles in a shape, • Expressing complementary angles as "90°", supplementary angles as "180°", • Only angles with one opposite edge are considered opposite angles.	Erbay (2016), Taylan & Aydin (2017).
Related to drawing a perpendicular from a point on the line or not on the line: • The tendency of positioning the perpendicular to be drawn from a point not on a line parallel to the long side of the paper, • A perpendicular cannot be drawn from a point on a line.	Butuner & Filiz (2017).

The existence of various definitions of the concepts in the literature is shown as one of the most important reasons for students’ difficulties (Butuner & Filiz, 2017; Henderson & Taimina, 2005; Keiser, 2004). Definitions as the building blocks of mathematical thoughts undertake a fundamental task in forming a concept and distinguishing it from other concepts (Cakiroglu, 2015). According to Cakiroglu (2015), although there are many ways to define concepts clearly, expressions that do not meet the definition criteria will confuse, and mathematical communication could not be ensured. According to Keiser (2004), depending on students' concept use in mathematics or other sciences, what makes students' learning of particular concepts even more complicated is that some concepts continue to change in their emphasis; therefore, the definitions change over time.

Angle is such a concept that has been defined differently over the centuries. Depending on the mathematical context, the concept of angle can even carry different meanings today. Although the angle concept is perceived as simple, it is a multi-faceted concept, making it possible to have various definitions throughout history. However, definitions differ significantly in their emphasis.

Keiser (2004) classified the definitions of the concept of angle as

- A measure of the turning of a ray about a point from one position to another (dynamic),
- the union of two rays with a common endpoint (static)
- the region contained between the two rays (static) (p.288).

She stated that the definitions could generally include one of the three. Another classification is defined angle with the different perspective as “a geometric shape”, “a changing and dynamic structure”, and “a measurable attribute” (Henderson & Taimina, 2005). In these perspectives, the dynamic concept of angle includes action in the form of a rotation, rotation point, or direction between two lines. The angle as a measure is explained as the arc length, or the ratio between the areas of the circle segments and angle as a geometric shape is explained by two lines intersecting in space (Henderson & Taimina, 2005).

These definitions limit the concept by focusing more on one aspect of the angle regarding a relation, a quality, or a quantity than the other (Keiser, 2004). In the definitions, angle and angle measure concepts were used in the same meaning (Ertekin, 2015), this made it unclear what precisely the angle is, which situation indicates an angle, and what exactly was measured while measuring an angle (Henderson & Taimina, 2005; Keiser, 2004) and the necessary transitions between definitions (Cakiroglu, 2015) almost impossible. The first classification as "a measure of the turning of a ray about a point from one position to another" may correspond to the direction angle concept in trigonometry. Depending on the direction, it is possible to shift between definitions of the angle. It is formed with the ray in its pre-rotation initial position and the ray in its post-rotation ending position. Moreover, it is formed by the union of two rays with a common endpoint (Ertekin, 2015). In this case, the static angle structure will result from the situation representing the dynamic angle (Mitchelmore, 1998). If the angle is defined as the region contained between two rays, the region's size can be considered the measure of the angle, yet considering the infinity of the rays, the measurement will not be possible (Ertekin, 2015). Similarly, one could see that if the distance between the rays forming the angle is considered as the measure of the angle, it is not meaningful to measure it linearly. The length between the selected points on the lines would differ based on selection, although the rays' width remains the same (Kabaca, 2015).

Keiser (2004) observed similarities between the student definitions of angle concept and definitions or explanations recorded since Euclid's time when she examined the data obtained from student comments only with a historical perspective. This multifaceted structure, which manifests itself in defining the concept of angle, affects students' perceptions of the concept and results in misconceptions. There are several pieces of evidence to demonstrate this situation for students. The studies showed that the students had difficulties focusing on an angle in a triangle or square (Mason, 1989) by not defining the angle and the triangle adequately (Mason, 1989). Many students thought that an angle measure depends on the radius of the arc that points the angle and that the measure of the angle is related to the edge lengths (Devichi & Munier, 2013) or had the belief that one edge of the angle should be positioned horizontally. The direction should always be counterclockwise (Mitchelmore, 1998). Ubuz (1999) specifically emphasized that the reasons for 10th and 11^{th}-grade students’ errors and the misconceptions that cause these errors were the same in almost every question, and stated that this situation is a result of students are at the first level- visual- of the van Hiele geometry thinking levels. The studies on the subject conducted with the sixth and seventh-grade students showed that,

- students could not interpret the verbally written angle definition mathematically,
- although it is not known how many regions the angle separates the plane into, this topic is not cover with a complete understanding of this concept since students being able to find the points in the inner and outer regions,
- students do not know the concepts of angle and angular region,
- students' inability to draw the right angle and the reflex angle,
- students could not construct the meaning for angle edge concept,
- students could not write the common and non-common sides of adjacent angles,
- the idea that supplementary angles should always be adjacent reveals misconceptions that the concepts of the opposite, alternate interior, alternate exterior and congruent angles cannot be represented in figures (Doyuran, 2014; Erbay, 2016 as cited in Ozbellek, 2003).

In addition, studies have been conducted on the process of internalizing the concept of angle by primary school students (Keiser, 2004), examining the relationship between the edges length of an angle and the measure of the angle in this process (Devichi & Munier, 2013), the difficulties experienced by middle school students in understanding the line segment, linearity, ray and angle (Dane & Baskurt, 2011). It has been stated that a right angle can be a significant learning barrier, in particular for the tasks asked to focus on the edge length and angle (Devichi & Munier, 2013). On the other hand, Butuner and Filiz (2017) showed that most high-achieving sixth-grade students have misconceptions and have difficulties understanding the conceptual meaning of angle concept.

The reasons for the difficulties experienced by students in the learning process are stated in the sources, including the natural structure of the concept (epistemological obstacle) in its historical development, students' readiness level, comprehension ability (genetic and psychological obstacles) for personal development, and the obstacles deriving from the nature of learning, teaching model or the way the subjects are introduced in the sources (pedagogical (didactic) obstacle) (Cornu, 1991). Like the discussions in the historical process about the development of angle concept, the situations such as the difficulties arising from the nature of the concept (Keiser, 2004), the inadequacy of students' prior learning (Dane & Baskurt, 2011; Mitchelmore, 1998; Ozbellek, 2003; Van Hiele, 1986), the content and teaching method (Devichi & Munier, 2013; van Hiele, 1986; Zembat, 2010) that may result in misconceptions in students.

Fischbein (1993) examined the geometric reasoning process with a cognitive approach different from a developmental approach (van Hiele, 1986), in his work called The Theory of Figural Concepts, build this process on the combination of the concept and the figure (image) formed with concept's spatial features in mind. According to the theory, the interaction of concept and figure is essential. While the figure helps to make predictions for the solution with the help of intuitions, the concept creates the mathematical foundations of the ideas revealed by the intuitions and ensures that they are consistent. According to Fischbein (1993), the high-level reasoning process is the situations in which the concept manages the figure and then these two components transform into formal concept knowledge. Situations where the reasoning process is under the control of the figure will be an essential source of student errors and difficulties that will cause students to make incorrect inferences. The development of this process can be achieved by designing learning environments that strengthen students' conceptual knowledge and allow effective interaction between figure and concept. In this respect, several researchers have stated the necessity and importance for teachers to be aware of students' difficulties and misconceptions during instruction planning (Cornu, 1991; Graeber, 1999; Stump, 2001). In addition, this necessity and importance were discussed within the scope of pedagogical content knowledge (Shulman, 1986). It was deemed necessary for teachers to know and implement approaches to help students overcome these difficulties during the teaching process (Graeber, 1999; Ojose, 2015). However, studies show that teachers cannot anticipate the misconception and its root causes (Gokkurt Ozdemir et al., 2017). They cannot identify possible misconceptions, and they do not see that they may prevent students' learning in further practice (Asquith et al., 2007). The examination of the studies showed that misconceptions can take place at various grade levels. The fact that mathematics teaching in our country is mainly based on procedural knowledge makes it difficult to change this habit in the future, to adopt the conceptual view of mathematics for pre-service teachers, and to balance conceptual and procedural learning in their professional lives (Baki, 2015).

Angle Concept in Mathematics Curriculum

In the Mathematics Curriculum (Ministry of National Education [MoNE], 2013, 2018), the angle concept is firstly introduced in the sub-learning area of basic concepts in geometry in the third grade. Although the primary objectives are the same, some of the objectives have changed across grade levels in the 2018 mathematics program (MoNE, 2018). For example, the objective of "draws a perpendicular from a point on or outside a line" was in the 6th grade in 2013 program and moved to the 5th grade in the 2018 program (MoNE, 2013, 2018). Students' expressing the concepts of point, line, line segment and ray and giving examples of angles from their surroundings are firstly introduced in the 2018 Mathematics Curriculum (MoNE, 2018). In the fourth grade, the objective of 'determining of the rays forming the angle and the corner, naming the angle and showing it with a symbol' was included. This grade level includes the measure of the angle and the classification of the angles, the awareness that the angle is formed by the rotation of a ray around the starting point, and the explanations that the difference in the positions of the angles with the same measure does not influence the measure of the angle.In the fifth grade, the concept was handled in the geometry and measurement learning domain, and the students were asked to form acute, right and obtuse angles on grid paper and determine them. The instructions about drawing perpendiculars to a line from a point or not on a line are also included. In the sixth grade, in addition to the objective of "knows that the angle is formed by two rays with the common end point and shows it with a symbol" ; “draws a congruent angle of an angle” and “explores the properties of complementary, supplementary and opposite angles; and solves related problems” objectives are included.Thus, the curriculum includes two definitions that ease the transition between angle as “a measure of the turning of a ray about a point from one position to another (dynamic angle)” and “the union of two rays with a common endpoint (static)” (Ertekin, 2015). The width between the edges of the angle is called the rotational movement by one ray until it overlaps with the other. This width is considered as the measure of the angle, and the mitre and more sensitive protractor tools were determined as standard measurement tools to measure this magnitude by using the basic angle measurement approach (Kabaca, 2015), which determines the number of parts remaining in the angle by splitting the full circle a certain number of times.

This study analyzes the subject's place in the Mathematics Curriculum with a study on literature to identify the challenges and misconceptions about angles. While some of the studies focusing on the scope of student difficulties or misconceptions devoted a section to angle concept and basic geometric concepts, the other part focused on some components. In this study, the concept was examined by considering the Mathematics Curriculum (MoNE, 2013, 2018). In addition, identifying the difficulties faced by students and possible misconceptions is also essential in planning the teaching that will enable them to overcome these difficulties. Therefore, this study aimed to identify the difficulties and misconceptions of sixth grade students regarding the concept of angle. Thus, this study seeks to answer the research question of “What are the difficulties and misconceptions that sixth-grade students have about angle subject?”.

The sub-problems of the research are considered with following dimensions.

- What are the difficulties and misconceptions that sixth-grade students have about the definition, drawing and symbolic representation of an angle?
- What are the difficulties and misconceptions that sixth-grade students have about specifying the vertex and edges of an angle?
- What are the difficulties and misconceptions that sixth-grade students have about the measure of the angle?
- What are the difficulties and misconceptions that sixth-grade students have about adjacent, complementary, supplementary, and opposite angles?
- What are the difficulties and misconceptions that sixth grade students have about drawing a perpendicular line from a point on or not on a line?

Method

The study design was a qualitative case study. The case study is a research method used to answer how or why questions about cases where research focuses on a current phenomenon and where the researcher has almost no control over the events (Yin, 2014). In addition, "what" question is also necessary for the case study and is addressed within this scope (Yildirim & Simsek, 2016). This study aimed to identify the misconceptions and lack of knowledge that sixth-grade students have regarding the angle concept, one of the foundational concepts of geometry.

Participants

The participants of this research are 25 sixth-grade students studying at a public school in a western province of Turkey. A purposeful sampling method of criterion sampling was used in the participant selection process. The inclusion criteria for study participants were (1) being a sixth-grade student, (2) knowing the angle subject, and (3) volunteering for participation. The sixth-grade students were chosen in the study because the concept of angle, which is one of the essential concepts of geometry and handled at the visual level in the curriculum at the beginning, was included in the sixth-grade curriculum together with its formal definition. It is necessary to identify students' misconceptions and difficulties regarding angle concept so that these difficulties and misconceptions can be eliminated before they become more profound and cause difficulties in the further subjects of geometry. All of the participating students were selected from the same school. Seven of them are girls, and 18 are boys, with an average age of 11.

Data Collection

To determine the misconceptions and knowledge gaps of the students about angles, firstly, the studies on this subject in the literature were examined, and knowledge gaps, errors and misconceptions mentioned in the studies related to angle concept and angles were determined. The misconceptions identified are shown in Table 1 of the previous section and were used to develop the open-ended measurement tool.

After examining the studies, researchers developed a measurement tool including 17 open-ended geometry questions that do not require any calculations and suitable for the objectives in the Middle School Mathematics Lesson (5, 6, 7, 8th Grades) Curriculum (MoNE, 2013). This tool included open-ended items to reveal errors or misconceptions on the definition of an angle, such as its drawing, its notation with symbols, the measure of an angle, adjacent, complementary, supplementary and opposite angles, drawing a perpendicular from a point on or not on a line to a line (see Table 2).

Table 2.

The Distribution of the İtems in the Open-Ended Measurement Tool

Content	Item numbers
Angle definition	1, 5
Angle construction (drawing)	1, 3
Angle's vertex, edges and representation by symbol	1, 2, 3, 4
Angle measure	6, 7, 8, 17
Adjacent, complementary, supplementary and opposite angles	9, 10, 11, 12, 13, 14
Drawing a perpendicular from a point on or not on a line	15, 16

The students were given a grid paper and were asked to compare the angles' measurements and respond with drawings. Thus, it was ensured that the students were able to answer without needing any measurement tool (protractor, etc.), and the students were asked to explain their answers and they were provided opportunities to reflect their ideas. The students were asked to draw to compare the measurements of the angles to find out what they focus on. Students were given rulers to use for drawing. The measurement tool included more than one item to find out the misconceptions. Situations that might lead to a misconception were also addressed in the replies. Thus, it has been tried to minimize the influence of situations such as student mistakes caused by carelessness, lack of knowledge or random answers by looking for evidence in such situations. Some students were asked to answer the same questions again to verify the accuracy of the data. In so doing, misconceptions were identified.

The designed items were examined by three experts, two of whom are mathematics educators, and expert opinion was obtained. A sixth-grade student conducted a pilot study, and feedback was received to test whether the items were communicating. Revisions were made in line with the feedback received after the examination, and then the test was finalized by obtaining a second round of expert opinion. Example open-ended items used in the research are given in Appendix 1.

The data were collected after students learned the subject of angles in the 2017-2018 academic year. After administering the open-ended measurement tool, unstructured interviews were conducted with some students to clarify the situations caused by misunderstandings or lack of expression in the items and verify the data. In these interviews with the students, we focused on the incorrect and inconsistent answers and the situations that could be misconceptions were tried to be identified/verified.

Data Analysis

In this study, data obtained from 25 students were analyzed to identify common student difficulties and misconceptions. Content analysis was used with the measurement tool consisting of open-ended problems. With content analysis, it was aimed to describe the data from the students' written responses and reveal the meaningful patterns that may be hidden in the data (Yildirim & Simsek 2016). A literature study on the themes for the difficulties and misconceptions about the angles were used to analyze data. The findings were reported accordingly. These themes are related to students' misconceptions and difficulties regarding the definition and types of an angle, drawing an angle, symbolizing an angle, measuring an angle, adjacent, complementary, supplementary and opposite angles, and drawing a perpendicular from a point on or outside of a line.

Two independent coders coded the data to meet the reliability criteria. Coders added additional codes by considering misconceptions and knowledge gaps in the literature. The disagreements between the two coders were discussed, and the opinion with the highest percentage was considered the common opinion (Lincoln & Guba, 1985). The situations in which both coders made a joint decision were identified as misconception and student difficulties. The codes obtained were presented by being themed based on the subject content. A field study was carried out with the participant students for a sufficient time to ensure the research validity. When the responses were not understood clearly during the interviews, member checking and in-depth descriptions were used in the analysis.

Findings

Findings Regarding Definition, Drawing and Symbolic Representation of Angle

Within the scope of this theme, students were asked to define the angle, draw an angle and represent it with a symbol. However, the findings related to students' difficulties encountered in the literature as they did not have sufficient language to express the concepts and thus, they have a hard time expressing them verbally (see Table 1). Another question discussed the literature expressions on the definition of the angle with visual support.

When the responses given by the students regarding the definition of the angle are examined, only six students (S9, S14, S16, S19, S21, S22) could define the angle as "An angle is a shape formed by two rays with a common endpoint (starting point)". However, it is noteworthy that some of the students who defined the angle in this way responded to yes when they were asked, "Is the angle the region between two rays with the common endpoint?" (S19, S22) and "Is the angle wideness between two rays with the common endpoint?" (S9, S16, S19, S22). Various responses given by 19 students other than these students to the definition of angle are summarized in Table 3.

Table 3.

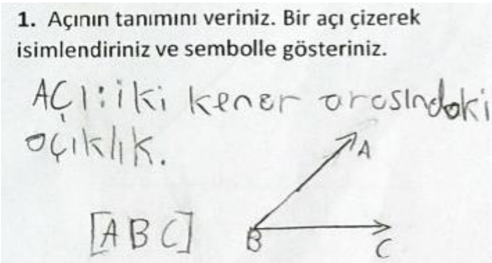
Student Responses Regarding the Definition of Angle

Codes	Example Expression	Students
Common Definition	*"An angle is a shape formed by two rays with a common endpoint"*	S9, S14, S16, S19, S21, S22
Wideness between edges	*"Angle is the wideness between two rays with the common endpoint."*	S1, S5, S6, S11, S12, S15, S17, S24
Other		
Explanations on the measure of the angle or the types of angles	*"Angles are right angles, acute angles, obtuse angles, reflex angles, and straight angles."*	S7, S13, Ö20
Expressions to describe the angle	*"Angle is a varied symbol with edges."*	S3, S18, S25
Expressions made using example	*"We can see an angle in the minute hands of a watch"*	S4
No explanation	---	S2, S8, S10, S23

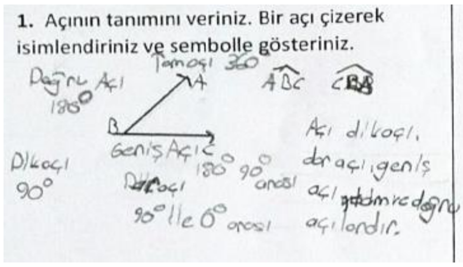
As seen in Table 3, most (f=8) responses to the question (define an angle, draw, name an angle and represent it with symbols) were incorrect. When the definition of the angle was asked, they directly emphasized the width between the edges of the angle (S1, S5, S6, S11, S12, S15, S17, S24) (Figure 1.a) and said: "An angle is a width between two rays with the common endpoint." When asked about the definition of an angle, some students replied with angle measures or types of angles instead (S7, S13, S20). For this, S20's explanation of "*Angles are right angles, acute angles, obtuse angles, reflex angles, and straight angles* "were coded as explanations on the types of angles Figure 1.b). Some of the students used various expressions to describe the angle (S3, S18, S25). One of the remarkable ones was S3's expression, "An angle is a varied symbol with edges." (Figure 1.c). One of the students (S4) explained the angle concept with an example:" *"We can see an angle in the minute hands of a watch."* Finally, four students (S2, S8, S10, S23) did not respond to the open-ended question about the definition of the angle.

Figure 1.

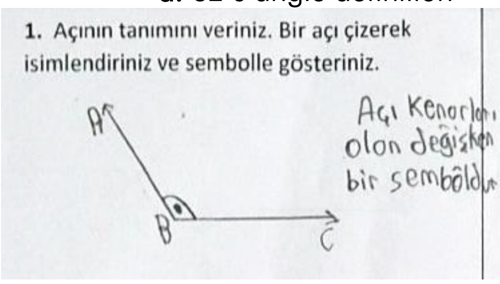
Examples of Students' Responses to the Definition of Angle



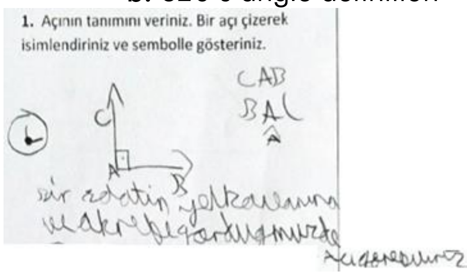
a. S2's angle definition



b. S20's angle definition



c. S3's angle definition



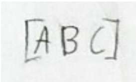
d. S4's angle definition

As seen in Figure 1, when the students were asked to draw angles, it was seen that they could draw various angles. Among these choices, students mostly prefer to draw acute angles and right angles (f=9). Some (f=5) prefer to draw obtuse angles, and a few prefer to draw all types of angles, including acute angle, right angle and obtuse angle (f=1). In addition, it was observed that one student did not draw at all in this question.

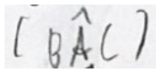
When the student responses (Questions 1 and 4) regarding the representation of the angle with a symbol were examined, it was seen that seven students (S6, S11, S12, S17, S19, S20, S24) correctly used symbols either for the angle they drew or for the angle with the given edges. Based on the responses examined under this theme, it was determined that most of the students (S1, S2, S3, S4, S5, S7, S8, S10, S13, S22, S23) had errors regarding the representation of the angle with symbols. It is noteworthy that even if students can correctly identify the vertex of the angle, they have errors in their symbolic representations. In particular, example symbolic representations of S1 and S2 are given in Figure 2.a and Figure 2.b, respectively.

Figure 2.

Examples of Students' Misconceptions About the Angle Symbol



a. S1's symbolic representation



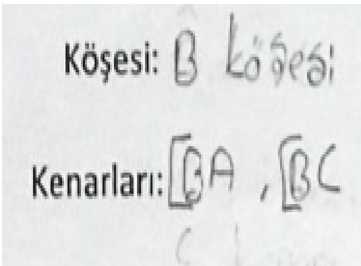
b. S2's symbolic representation

Findings Regarding Specifying the Corner and Edges of An Angle

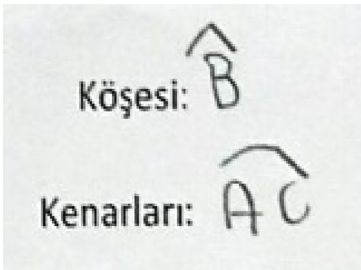
Regarding this theme, students were asked to "specify the vertex and edges of $\widehat{ABC}$" (without a given figure). Students' encountered difficulties and misconceptions regarding specifying the vertex and edge of an angle is shown in Table 4. In this question, only three students (S16, S20, S24) stated that the edges of the angle are rays and represented them with symbols (Figure 3.a). Apart from these students, nine students (S3, S6, S8, S10, S12, S15, S20, S21, S24) tended to express vertex or edges as angles (Figure 3.b and Figure 3.c). In addition, 16 students expressed the vertex of the angle as "B" and did not state that it was a point. In the interviews conducted to verify this situation, it was seen that the students could not express it as point B.

Figure 3.

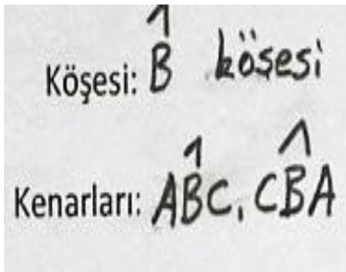
Students' Responses to the Vertex and Edges of an Angle



a. S16's response



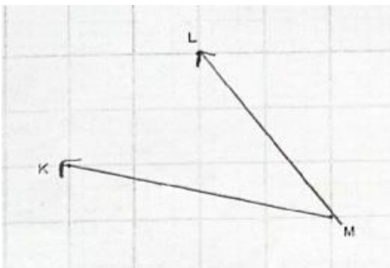
b. S3's response



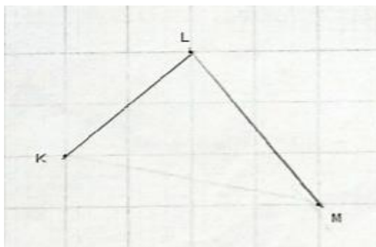
c. S10's response

Figure 4.

Examples of Students' Incorrect Drawing of the Angle



a. S13's response



b. S17's response

In another question, students were asked to draw (KLM)^using the points K, L and M on grid paper. In this question, two of the students (S3, S13) drew angles incorrectly (Figure 4.a), three students (S11, S17, S25) drew the edges as straight segments instead of rays despite positioning the angle correctly (Figure 4.b). The rest positioned the angles correctly. Here, it was seen that the majority did not have any difficulties in drawing the angle given with its symbol.

Table 4.

Difficulties and Misconceptions in Specifying the Vertex and Edges of an Angle

Codes	Students	f
Ability to specify the vertex and edges of an angle	S16, Ö20, S24	3
The tendency to express vertex or edges as an angle	S3, S6, S8, S10, S12, S15, S20, S21, S24	9
Incorrect drawing of an angle	S3, S13	2
Drawing the edges of an angle as line segments	S11, S17, S25	3

Findings Regarding the Angle Measure

Regarding this theme, four questions asked to the students to elicit the existing students' errors and misconceptions of whether the measure of the angle changes depending on the length of its arms (Figure 5, Figure 6, Figure 7, Figure 11), whether it changes according to the size of the interior region (Figure 10), whether it changes according to the length of the arc that indicates the measure (Figure 8, Figure 10). Students' difficulties and misconceptions regarding angle measurements are shown in Table 5.

Table 5.

Difficulties and Misconceptions about ahe Measure of an Angle

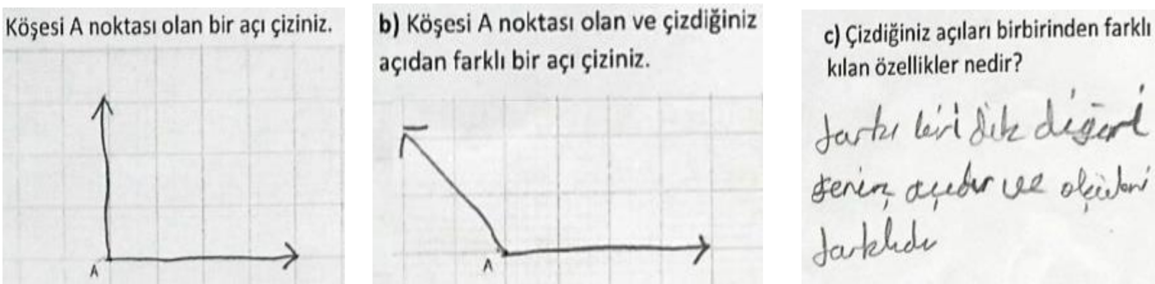
Codes	Students	f
Depends on the length of the arms	S5, S6, S16, S18, S21, S22, S25	7
Depends on the size of the interior region,	S5, S10, S22	3
Depends on the length of the arc pointing to measure	S1, S4, S5, S8, S10, S13, S15, S18, S20, S22	10

Students were first asked to draw an angle and then a different angle with the same vertex, and then they were asked to indicate the features that made these angles different from each other (Figure 5).

In literature, there are similar approaches with the findings (see Table 1) that the angles with the same measure, but different position are not congruent. The angle measurements depend on the edge length, such as the length of the arc pointing to the measure. In so doing, the angle measure can be determined despite the positional change. When the findings related to this question were examined, it was seen that all students except two students (S5, S23) were able to draw the two desired angles in the question. These students gave responses such as "wideness between the edges" (S1, S6, S9, S11, S13, S14), "measures" (S2, S7, S10, S12, S18, S19, S22) or "types" as the features that make the two angles different from each other. (S2, S3, S4, S7, S8, S13, S15, S17, S18, S20, S21, S24, S25). For example, S18 emphasizing the angle measure and types replied as "the difference is one is a right angle, and the other is an obtuse angle, and its measures are different" (Figure 5.c).

Figure 5.

S18's Response



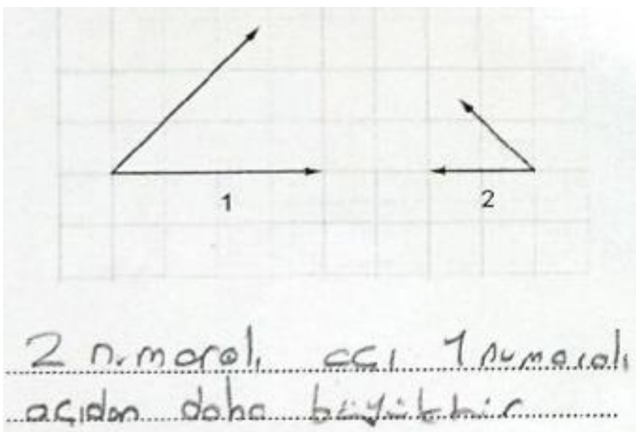
a. b. c.

In another question related to this theme, two congruent angles with different edge lengths, three angles with different measures and the smaller one with the edges drawn long, two angles with the longer length of the arc pointing to the measure and the smaller ones with wider shaded interior region compared, the larger one was given. The students were asked to compare the measures of the angles for all given situations (Figure 6, Figure 7, Figure 8, Figure 9).

When the responses of the students to compare the measurements of two congruent angles with different edge lengths were examined, seven students (S5, S6, S16, S18, S21, S22, S25) could not notice that the given angles were congruent. Two of these students (S16, S25), unlike the others, claimed that the angle with a shorter edge is larger than the one with the long edges. As an example of this situation, S25's response is given in Figure 6.

Figure 6.

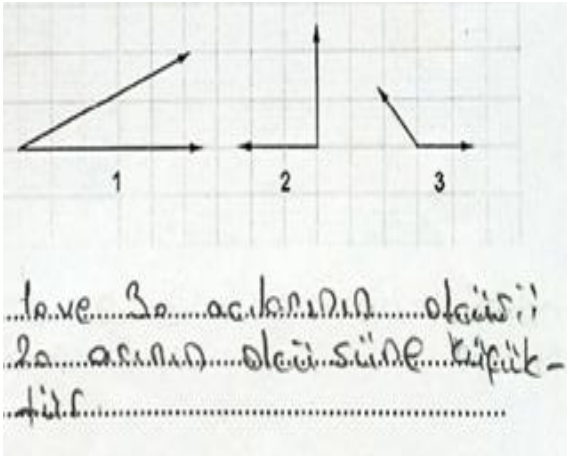
S25's Response



When the responses of the students to compare the measures of the three angles with different edge lengths and the smaller ones with the longest edges were examined, it was seen that two students (S5, S22) made an incorrect comparison. As an example of this situation, S22's response is given (Figure 7).

Figure 7.

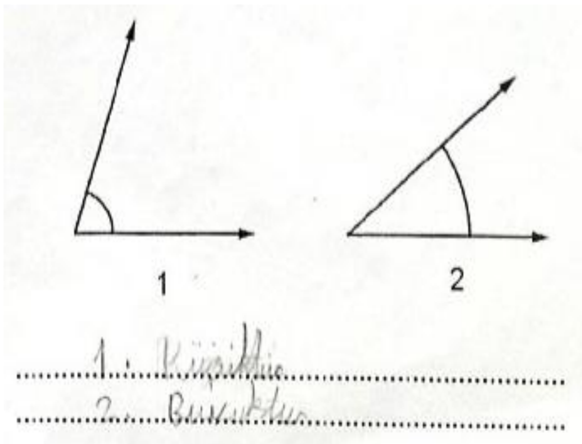
S22's Response



When the findings compare the measure of two angles in the case where the length of the arc that indicates the measure of the smaller angle, or in other words, the radius of the arc that expresses the measure, are longer, it was seen that one student (S5) could not make a correct comparison.

Figure 8.

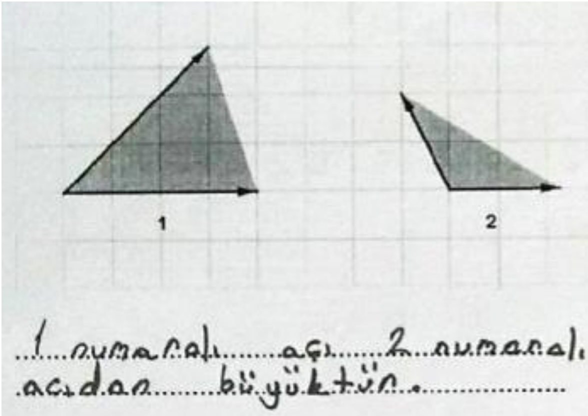
S5's Response



When the findings compare the measure of two angles in the case where the smaller one has a more shaded area in the interior region than the larger one,it was observed that three students (S5, S10, S22) could not make a correct comparison. S10's response is given as an example for this situation (Figure 9).

Figure 9.

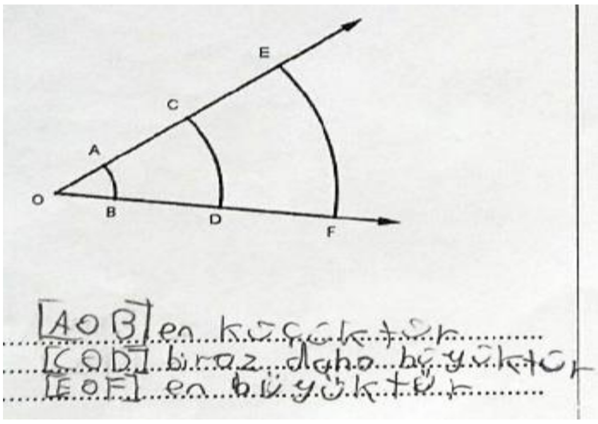
S10's Response



In another question, students were asked to compare angles, which defined as different but locatedin the same angle as presented in Figure 10. When the findings were examined, it was found that one student (S15) could not answer the question, and nine students (S1, S4, S5, S8, S10, S13, S18, S20, S22) could not see that there was only one angle given in the figure and expressed that the measure was larger than the others in the case of the longest arc. As an example of this situation, S1's answer is given in Figure 10.

Figure 10.

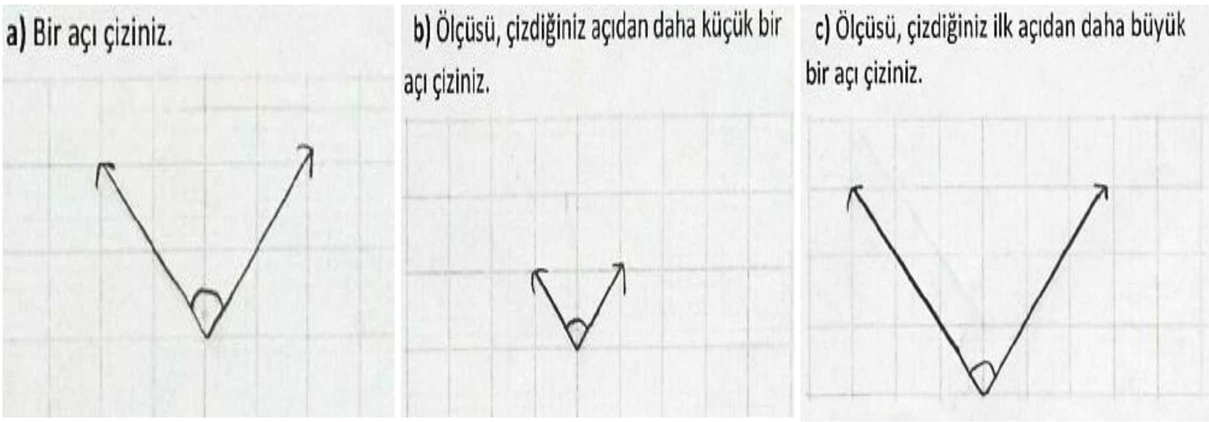
S1's Response



In another question related to this theme, students were first asked to draw an angle. Then, they were asked to draw another angle with measures smaller and larger than the one drawn (Figure 11). When the findings were examined, it was observed that six students (S5, S13, S15, S21, S22, S25) could not give the expected answer. Three of these students (S5, S13, S22) drew an angle by drawing the edges of the first angle as short and long. For example, the angles drawn by S22 are given in Figure 11. It is a remarkable finding regarding students' misconception that S5 and S22 made the same error in the questions given in Figure 6 and Figure 10.

Figure 11.

S22's Response



Findings regarding Adjacent, Complementary, Supplementary and Opposite Angles

Table 6 shows the difficulties and misconceptions about adjacent, complementary, supplementary, and opposite angles.

Table 6.

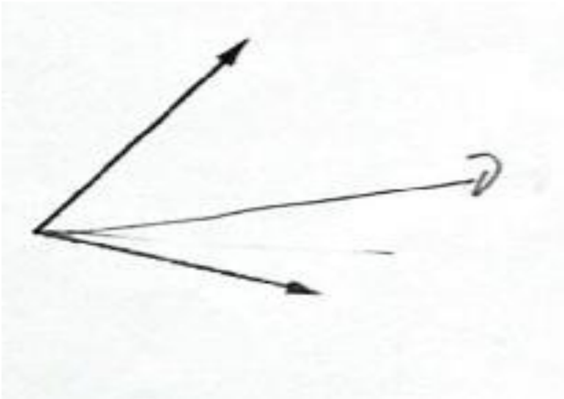
Difficulties and Misconceptions about Adjacent, Complementary, Supplementary and Opposite Angles

Codes	Students	f
Draw an angle adjacent to an angle	S1, S8, S18, S21, S22	5
Cannot define complementary angle	S1, S3, S4, S5, S8, S13, S14, S16, S22, S23, S24, S25	12
Cannot draw complementary angle	S3, S4, S5, S8, S13, S18, S21, S24, S25	9
Cannot define supplementary angle	S1, S3, S4, S5, S8, S13, S14, S16, S22, S23, S24, S25	12
Cannot draw supplementary angle	S3, S4, S5, S8, S18, Ö20, S21, S22	8

When the findings on drawing adjacent angles were examined, it was seen that five of the students (S1, S8, S18, S21, S22) could not draw an angle adjacent to an angle, and three of them (S1, S8, S21), instead of drawing an angle adjacent to the given angle, as seen in Figure 12 they drew a ray in the interior region of the given angle and split the angle into two adjacent angles.

Figure 12.

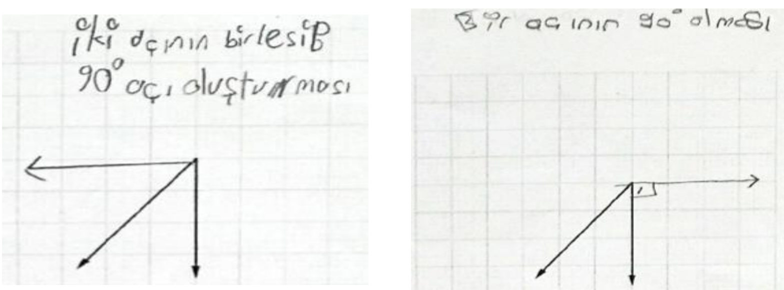
S21's Response



When the findings for complementary angles are examined, the definition knowledge about this concept is discussed. Here, it was seen that 13 students could make a correct definition in general, seven students (S1, S4, S5, S8, S13, S24, S25) could not make the correct definition, and five students (S3, TS4, S16, S22, S23) could not make any explanation. After defining the complementary angle, the findings related to its drawing were examined. When the students were asked to draw the adjacent complementary pair of the given angle, 16 students were able to draw the adjacent complementary pair of the given angle (Figure 13.a), while nine students (S3, S4, S5, S8, S13, S18, S21, S24, S25) could not draw (Figure 13.b). However, although two students (S18, S21) could make a correct definition, they could not draw the angle which is the adjacent complementary pair of the given angle. In addition, a student (S1) who could not make a correct definition and four students (S14, S16, S22, S23) who could not define the complementary angle were able to draw the expected drawing.

Figure 13.

Students' Responses about Complementary Angle



a. S9's response **b.** S25's response

When the findings onsupplementary angles are examined, the definition of this concept is discussed first, similar to complementary angles. When students were asked to define supplementary angles, 13 students were able to make a correct definition in general, six students (S1, S4, S5, S8, S13, S25) could not make the correct definition, and six students (S3, S14, S16, S22, S23, S24) could not explain. After defining the supplementary angle, the findings related to its drawing were examined. When the students were asked to draw the adjacent supplementary pair of the given angle, it was seen that 17 students could draw the adjacent supplementary pair of the given angle, while eight students (S3, S4, S5, S8, S18, S20, S21, S22) could not draw it. When the drawings made by the students were evaluated together with the findings for the definition, three students (S18, S20, S21) could give a proper defitinion but could not draw the angle which is the adjacent supplementary pair of the given angle (Figure 14.a). However, it was observed that three students (S1, S13, S25) who could not make a correct definition and four students who did not make any explanation (S14, S16, S23, S24) were able to draw as expected. In Figure 14.b, it is seen that S25 can draw supplementary angles even though s/he could not make a correct definition.

Figure 14.

Responses of S21 and S25

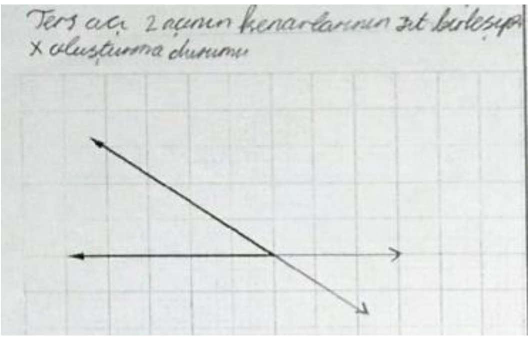
a. S21's response   **b.** S25's response

When the findings on the definition of opposite angles were examined, it was seen that only two students (S6, S19) could define opposite angles correctly. It was observed that 14 students could not make a correct definition, and 9 students (S3, S9, S11, S13, S14, S20, S22, S23, S25) could not provide any explanation.

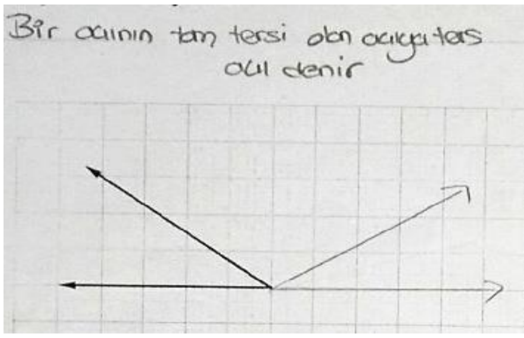
The students were asked to draw an opposite angle of the given angle after defining opposite angles. When these drawings were examined, it was seen that 11 of them were able to draw as expected. However, when these drawings are examined together with their definitions, there were two students (S6, S19) whose description and drawing are sufficient, five students (S1, S2, S15, S16, S21) who could not make a correct definition, and four students (S9, S11, S14, S22) who did not make any explanation about the definition were able to draw the desired drawing. In addition, most of the students who made incorrect drawings drew only one side of the angles as opposite rays (S3, S4, S5, S7, S8, S13, S18, S20, S24). Figure 15 shows examples of definitions and drawings made by students for opposite angles.

Figure 15.

Definitions and Drawings Made by Students for Opposite Angles



a. S19's response



b. S24's response

Constructing A Perpendicular to Any Line from A Point on The Line or Not on The Line

Finally, the students' knowledge and errors about drawing a perpendicular from a point outside and on a given line were examined. The difficulties and misconceptions of students regarding this theme are shown in Table 7.

Table 7.

Difficulties and Misconceptions Regarding Drawing a Perpendicular to a Line from a Point on or Not on a Line

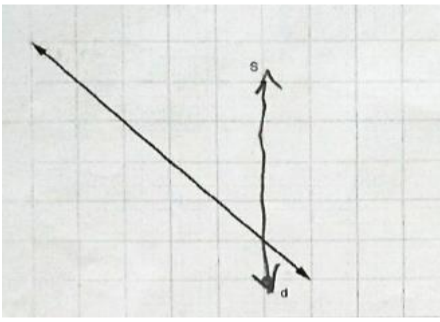
Codes	Students	f
Drawing a perpendicular to a line from a point on or not on the line	S2, S5, S22	3

When the findings on drawing a perpendicular to a line from a point not on the line were examined, it was seen that except for three students (S2, S5, S22), all students were able to draw correctly. In the findings of the students who could not draw correctly, it was observed that there was a tendency to position the perpendicular parallel to the side of the paper (Figure 16.a).

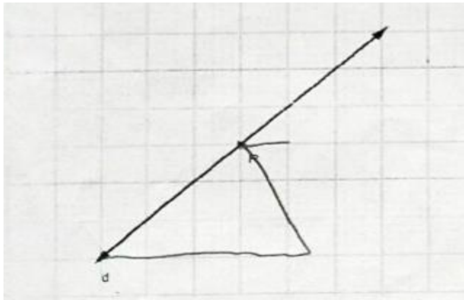
When the findings regarding drawing a perpendicular to a line from a point on the line were examined, it was seen that two students (S5, S22) could not draw the perpendicular, and one student (T8) did not draw anything (Figure 16.b).

Figure 16.

Responses of S2 and S5



a. S2's response



b. S5's response

Results and Discussion

The research concludes that the students have knowledge gaps and misconceptions about the definition of an angle, its drawing and representation with symbols, specifying its vertex and edges, its measure, types, and drawing perpendicular to a line.

The most apparent misconception of the students regarding the definition of an angle is that they state the angle as "the wideness between two rays with the common endpoint", while the other student explanations consist of expressions related to the types of angles, describing the angle and expressions using an example. Here, it can be said that students have similar difficulties when their experiences with the definition and measure of angle are examined as in the historical process (Keiser, 2004). As Keiser (2004) stated in his study, students making mistakes by using more than one expression about the concept of angle seems like a normal result of the multifaceted nature of this concept as in the historical development process. Erbay (2016), on the other hand, stated that the gaps in the angle definitions of the students might stem from the lack of comprehensive concept learning at school, rather than learning a different or incorrect definition.

Studies (Cetin & Dane, 2004; Kilic, Temel & Senol, 2015; Yazgan, Argun & Emre, 2009; Yeşildere, 2007) show that teachers also have misconceptions about the definition of angle. Kilic, Temel, and Senol (2015) also identified in their study that primary school teacher candidates and teacher candidates who receive formation training in the field of mathematics teaching also have this misconception about the concept of angle. This situation makes us think that this misconception of the teachers documented in these studies may affect students' perceptions about the concept of angle. In the studies of Cetin & Dane (2004), it was determined that primary school teacher candidates could not define and apply the essential concepts in geometry. Considering that students encountered the concept of angle for the first time in the first stage of primary education, it can be thought that classroom teachers' perceptions can influence their teaching and therefore explain the difficulties and misconceptions that students have. In this study, when the students were asked to draw an angle, it was seen that they mostly chose to draw the acute angle and right angle. The tendency to draw right angles as a prototype in angle drawings has been emphasized in the literature (Baldy et al., 2005; Butuner & Filiz, 2017; Devichi & Munier, 2013; Doyuran, 2014). For example, in the study by Baldy et al. (2005), when students were asked to draw any angle, they generally drew right angles and tended not to accept obtuse angle as an angle. The reason why students particularly prefer to draw right angles is explained as their familiarity with quadrilaterals with right angles in the teaching process starting from the first stage of their primary education (Devichi & Munier, 2013). The fact that the students' learning processes in the first stage of primary education could not be followed in this research suggests that their tendency to draw the right angle as a prototype may be due to their prior learnings.

When students asked to represent an angle with a symbol, it was also determined that most of the students had difficulties using the correct symbols, and even though they could identify the corner correctly, they had errors in the representation. Some students made errors like using an angle symbol while representing vertex or edges of an angle and failed to state that the vertex of an angle is a point. However, when the students were asked to draw a certain angle, it was seen that the students did not have any trouble in drawing the angle given with the symbol. Doyuran (2014) also reported similar student errors in the angle representation with symbols, as seen in this study. These errors made by the students in using symbols could be due to insufficient emphasis on the use of symbols in the teaching process. Since mathematics is explained with the help of symbols, it should help students learn and use this symbolic language (Calikoglu Bali, 2002).

It is seen that the most common error made by the students in specifying the vertex and edges of an angle is the tendency to "express the vertex and edges of an angle as angles". In addition, many students did not emphasize that the vertex of the angle is a point, and a few students made errors such as drawing the angle incorrectly or drawing the arms of the angle as a straight line. It is thought that this may be due to the inability to provide students with meaningful learning about the concept of angle edge due to reasons such as not being able to comprehend the components of the angle in the teaching process or not being able to connect the point-ray-angle concepts sufficiently. In this case, to overcome the students' difficulties and misconceptions, it may be necessary to review the teaching process and teach for addressing these encountered difficulties.

It is seen that the students have the misconception that "the angle measure changes depending on the arm length". When the literature was examined, similar results were found about the angles (Devichi & Munier, 2013; Keiser, 2004; Mitchelmore, 1998). Doyuran (2014) stated that the reason for this misconception was that students did not know that the arms of the angle were rays. Examining from another perspective, Devichi and Munier (2013) emphasized that students who have a higher tendency to draw prototypes for right angles have a misconception that the measure of the angle changes depending on their arm lengths, but that students who do not tend to draw these prototype drawings develop the concept of wideness while distinguishing different angles in the process of learning the concept of angle.

As to the angle measure, some students had the misconception that "the length of the arc indicating the measure". In other words, they assumed it was "the radius of the arc that indicates the measure". On the other hand, a small number of students had the misconception that "the measure of the angle changes according to the size of the shaded interior region". In the studies conducted, similar results were found that the angle measure changes according to the length of the arc indicating the measure of the angle (Butuner & Filiz, 2017; Keiser, 2004; Mitchelmore, 1998) or that the measure of the angle changes according to the size of the shaded interior region (Butuner & Filiz, 2017). Especially in Keiser's (2004) study, students used various explanations for the angle measure. These included the linear distance between the rays, the ray length, the area between the rays, or the length of the arc drawn between the rays as the angle measure. The existence of several students' difficulties and misconceptions regarding the measure of an angle may be due to the insufficient content knowledge of the teachers, which is one of the most important components of the teaching and learning process. Yazgan, Argun, and Emre (2009) concluded that mathematics teachers do not have sufficient knowledge about the concept of "angle" and "measure of an angle" in terms of the presentations they use. It was observed that teachers had insufficient content knowledge on the concept of angle. It was stated that this was due to their previous (primary, middle and secondary) education and that they could not close the gap between what they learned in the undergraduate curriculum and what they taught to students in schools. In this context, Yesildere (2007) also stated that 20% of primary school pre-service mathematics teachers used mathematical concepts incorrectly, and one of the errors encountered was the use of the concept of "angle" instead of "angle measure". In this context, teachers need to develop their content knowledge by providing pre-service and in-service training to plan the teaching process by identifying possible misconceptions that their students may have.

This study concluded that the students had various difficulties in defining and drawing adjacent, complementary, supplementary, and opposite angles. In his study, Erbay (2016) mentioned that sixth-grade students' knowledge of adjacent, complements and supplementary angles is limited based on rote-memorization and that they are unsuccessful when faced with different questions than they are accustomed to. In their study, Taylan and Aydin (2018) emphasized that sixth-grade students could not define these angles even though they did the calculation questions about these angles and explained the reason for this situation by the widespread use of multiple-choice exams in our country. In this study, it was seen that the students experienced various difficulties because they were worked on questions that were not based on any calculations and were different from the ones they were accustomed to. In the teaching process of geometry subjects, question types should be diversified in defining and drawing adjacent, complementary, supplementary, and opposite angles, and questions for conceptual understanding rather than procedural understanding should be included in this process.

Some students' knowledge gaps and errors regarding "drawing a perpendicular to a line from a point outside or on the line" were determined. Butuner and Filiz (2017) mentioned a similar misconception in their study and especially mentioned that students believe that lines drawn parallel to the long side of the paper are perpendicular to any given line and that a perpendicular line cannot be drawn from a point on a line. However, Karakus (2014) emphasized that constructing a perpendicular line from a point outside or on a line is stated by Smart (1993) as one of the basic constructions in Euclidean geometry and that it is effective in solving more complex geometry problems. In this context, as seen in this study, the teaching process of drawing perpendicular to a line, which is one of the geometric construction topics that students have difficulty with, should be enriched and opportunities should be provided for students to make drawings on this subject, which is often not emphasized.

As a result, this study identified many difficulties and misconceptions of students about angles. Studies (Baldy et al., 2005) also confirm that students have difficulties verbalising an angle's properties, drawing an angle, and clearly defining angles. Teachers and teacher candidates should consider these difficulties and misconceptions of students regarding concepts and orchestrate their learning environments accordingly. However, studies reveal the inadequacies of teacher candidates and teachers. This study and similar studies will support teachers to reveal these situations.

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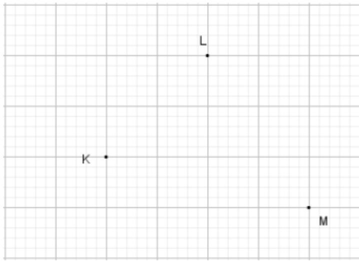
Appendix 1. Sample open ended problems

Definition of an angle

1. Açının tanımını veriniz. Bir açı çizerek isimlendiriniz ve sembolle gösteriniz.

Drawing angle

3. Aşağıdaki verilen K, L ve M noktalarını kullanarak $\widehat{KLM}$ nı çiziniz.



Representation of Angle

4. Kenarları [DE ve [DF olan açı aşağıdaki sembollerden hangileri ile gösterilebilir?

$\widehat{D}$ ....☐

$\widehat{E}$ ....☐

$\widehat{F}$ ....☐

$\widehat{EDF}$ ....☐

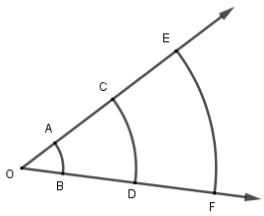
$\widehat{FDE}$ ....☐

$\widehat{DEF}$ ....☐

$\widehat{DFE}$ ....☐

Angle Measurement

8. Şekildeki $\widehat{AOB}$, $\widehat{COD}$ ve $\widehat{EOF}$ açılarının ölçülerini karşılaştırınız.



....

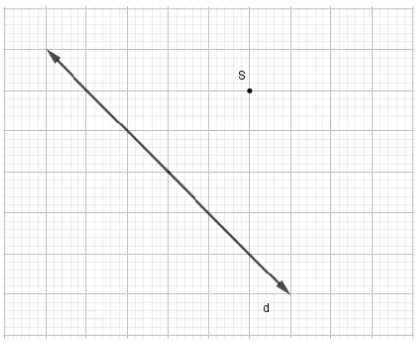
....

....

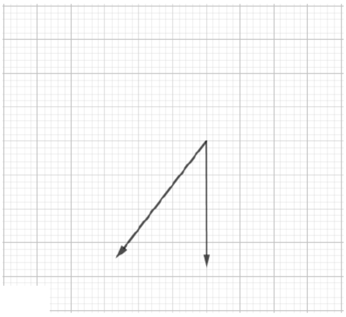
Adjacent, complementary, supplementary, and opposite angles.

Constructing a perpendicular to any line from a point on the line or not on the line

15. Aşağıda verilen d-doğrusuna S noktasından dikme çiziniz.



10. Tümler açılar nedir? Açıklayınız ve aşağıda verilen açının komşu tümlerini çiziniz.



The Process of being a Teacher in a Reggio Emilia-Inspired Preschool: A Phenomenological Study*

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Abstract: The current research aims to examine how Reggio Emilia-inspired preschool teachers in Turkey make sense of being Reggio Emilia-inspired teacher and what they experience during this process. In this research, one of the qualitative research methods, namely, Phenomenological Research Design, was used. Data were collected using semi-structured interviews. In this study, 20 preschool teachers in Reggio Emilia-inspired schools located in Istanbul, Ankara, and Izmir provinces were included. Participants were determined using the purposeful sampling strategy. For data analysis, this research was conducted using the thematic analysis in which categories and codes were created upon similarities found in the data. The findings obtained in this study revealed that a teacher who was inspired by the Reggio Emilia Approach experiences five stages of transformation. These stages were as follows, respectively: 1. Hearing the Reggio Emilia approach for the first time, 2. Affective reaction 3. Internalization 4. Comparison 5. Placement. Participants in the current research stated that being a Reggio Emilia-inspired teacher was a pleasant, enjoyable, intensive process and an endless journey in which they helped children construct their knowledge.

Keywords: Early childhood education, reggio emilia approach, reggio emilia-inspired teacher, phenomenology.

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Introduction

The Reggio Emilia approach refers to a democratic education system, also called "alternative education" in early childhood education. The foundations of this system were laid after World War II. People decided to build a school for their children by selling a few tanks, trucks and horses that remained in their hands after the war. To the primary school teacher, Loris Malaguzzi, this idea initially seemed unbelievable, but then Malaguzzi and the village people worked day and night to build their school (Malaguzzi, 1998; Thornton & Brunton, 2010). Thus, in the Reggio Emilia approach, education is structured as a community movement. Adults and children share their culture by discussing, making discoveries together (Edwards, 1998; Inan, 2012).

Foundations of the Reggio Emilia Approach

The Reggio Emilia pedagogy, which is highly influenced by the constructivist understanding of Jean Piaget and the social constructivist understanding of Lev Vygotsky, is structured on six basic principles. These are a strong and interested "Child Image", a new "Teacher Image" with a wide range of roles, "The Environment as Third Teacher" which supports children's education and development and provokes their interest like teachers, "Relationships" which emphasize physical and social relationships, "Project" through which integrated activities largely focused on arts and science are conducted and "Documentation" which is seen as a tool of evaluation and planning. In the process of becoming a Reggio Emilia-inspired teacher, it is necessary to act in accordance with all these technical and philosophical principles. In particular, it is necessary to have the child image that Reggio Emilia teachers have. To have a positive child image as Reggio Emilia teachers have, one must believe in the following characteristics: The child is curious and wonders about the world like a scientist, asks questions; learns actively, that is, constructs his/her knowledge by doing and experiencing; questions, does not take it as it is, explores underlying causes and likes to play with variables; expresses his/her feelings and thoughts using different means, such as visual arts, can cooperate and collaborate with others; is strong; is an individual having interests and needs; and is willing to learn (Cadwell, 2011; Dahlberg, 2000; Gandini, 2002; Malaguzzi, 1998; Rinaldi, 2006; Thornton & Brunton, 2010).

Teacher in the Reggio Emilia Approach

In Reggio Emilia schools, there are two partner teachers in the classrooms and these teachers work together (Malaguzzi, 1998). The training period for teachers is between 24 August and 13 July. Teachers working in crèches spend 31 hours a week with children and five hours in other activities (e.g., material preparation, professional development, management, planning and meetings with families). Teachers working in kindergartens spend 30 hours a week with children and six hours in other activities (e.g., planning, management, professional development, material preparation and meetings with families) (Guidici et al., 2001)

Teachers work systematically. Class teachers work in collaboration with pedagogists (education experts) and atelieristas (studio teachers). Atelierista is an expert in arts. He/she helps children express themselves through different methods and techniques in workshops called Atelier at school. In the metaphor of "100 languages of the child" in the Reggio Emilia approach, children express what they learn with their own feelings and thoughts in various branches of art, such as painting, dance, drawing and clay. However, here, art studies should not be considered lessons (Edwards, 1998; Malaguzzi, 1998; Vecchi, 1998)

The Pedagogista working at Reggio Emilia schools is a program coordinator who is an expert in pedagogy or psychology (Guidici et al., 2001). Pedagogistas share new theories in education and development with teachers, establish connections between their schools and other schools and the municipality, visit schools under their responsibility on some days of the week, and conduct interviews to initiate new projects or monitor ongoing projects. They are also closely involved in the development of children (Cadwell, 2011; Filippini, 1998).

Malaguzzi (1998) stated that great importance should be attached to in-service training. Teachers hold regular meetings with the pedagogista and atelierista. Teachers willingly attend these meetings. They exchange ideas on new, ongoing or finished projects. The person who made teachers adopt this way of working is Malaguzzi, the main founder of the approach (Cadwell, 2011).

In the literature, the differing roles of Reggio Emilia teachers are classified as follows: "Listener and observer", "Student", "Researcher", "Assistant and guide" and "Provocateur" (Hewett, 2001; Inan, 2012)

1- In the role of listener and observer, they observe and listen to children. Listening has a deep meaning for Reggio Emilia teachers and is an active action (Rinaldi, 2006). Listening refers to "watching children paying full attention and recording what has been watched. Then, the resulting documents are used as the basis in the decision-making process that proceeds with the participation of children and their families" (Edwards, 1998, p. 181).

2- In the role of student, teachers learn new knowledge together with children. Teachers come out of their role of an expert and constructor knowing everything and adopt the role of a person who researches and learns together with students (Inan, 2012).

3- In the role of the researcher, they use their documentation to explore children's interests and curiosity and plan possible projects. They work in partnership with other teachers and conduct research under the leadership of the pedagogista to help children discover what they want to learn (Hewett, 2001; New, 1993; Rinaldi, 1998).

4- In the role of assistant and guide, they listen to children and create environments where children can work in collaboration (Wexler, 2004). Teachers are friends who help and guide children in the construction of knowledge, not those who have knowledge (Fraser and Getswicki, 2002).

5- In the role of provocateur, they encourage children to explore learning paths suitable for them, solve problems and think in different ways (Hendrick, 2004).

When the literature is reviewed, it is seen that many researchers from different countries have been conducting research on the Reggio Emilia approach (Akar-Gencer & Gonen, 2015; Finegan, 2001; Imir, 2018; Inan & Kayir, 2015; Kim & Darling, 2009; Nelson, 2000; Ozturk, 2006; Stegelin, 2003; Strickler, 2012). In recent years, many preschool education institutions and their teachers in Turkey have been affected by the Reggio Emilia approach based on the democratic education system and have been working to implement this new philosophy in their institutions. While Akar-Gencer and Gonen (2015) examined the effects of Reggio Emilia-based studies on children's creativity skills, Imir (2018) examined the effects of Reggio Emilia-based documentation practices on children's thinking skills. While implementing this philosophy that has just begun to be understood in Turkey, preschool teachers are experiencing a serious process of change and development. Lack of information about the opinions of teachers about the practices of the Reggio Emilia approach in Turkey made it necessary to conduct the current study. Thus, the current study aims to reveal how teachers working in schools that implement the Reggio Emilia approach in Turkey make sense of being Reggio Emilia-inspired teacher and their experiences regarding this process.

Method

In the current study conducted in accordance with qualitative research methods and techniques, it was aimed to reveal the process of becoming a Reggio Emilia teacher based on the perceptions of preschool teachers in a realistic and holistic manner. A qualitative research design was created in which the participants were seen as a data source, and in-depth data were collected through open and flexible semi-structured interviews (Yildirim & Simsek, 2013). In such studies called phenomenological research, participants' experiences of a phenomenon are revealed through a holistic description of what and how participants have experienced (Creswell, 2013; Patton, 2014; Van Manen, 1990). In this connection, the phenomenon to be focused on in the research process was determined as the experiences of preschool teachers who conducted applications based on the Reggio Emilia approach. In addition, the focus of this study was to examine the opinions of the participants in depth and to reveal how they made sense of the approach through a holistic description because the phenomenological approach as an approach having philosophical foundations is built on individuals' making sense of their own experiences and focuses on the essence of the phenomenon in the individual's perception.

Different ways can be adopted in phenomenological research as in other types of research. In the current study, epoche and phenomenological reduction were attempted to be made. In phenomenological studies, "Epoche" is defined as the researcher's self-blocking or suspending his/her own preconceptions/prejudices about the research, while "phenomenological reduction" can be defined as the researcher's focus on the participants' perceptions of the phenomenon being studied (Dowling, 2007). In the current study, the researcher blocked her own prejudices and judgements as much as possible and tried to neutralize herself to prevent the preliminary information she obtained from the literature review from affecting her research. Then, the researcher made a phenomenological reduction in this research process by trying to interpret the data obtained from the teachers through the lenses of an independent mind. Thus, she tried to understand the participating teachers' experiences in becoming Reggio Emilia-inspired teachers without involving her own judgements because, in phenomenological research, it is essential for the researcher to focus on the perceptions of the participants by leaving aside his/her own prejudices, beliefs and prior knowledge regarding the phenomenon under investigation and to explain the phenomenon that is examined from the perceptions and experiences of the participants (Ashworth & Lucas, 1998; Ashworth & Lucas, 2000; Moustakas, 1994).

Participants

In the selection of the participants, homogeneous sampling, a type of purposive sampling, was used. Purposive sampling allows for in-depth investigation of specific situations in accessing rich data (Buyukozturk et al., 2010; Patton, 2014). In this context, "conducting applications based on the Reggio Emilia approach" as the common characteristic of the participants constitutes the homogeneity of the group.

Table 1.

Participant Information

Gender	Female	19
	Male	1
Age	18-24	6
	25-31	4
	32-38	5
	39-45	5
Education level	High school	3
	Associate's degree	4
	BA degree	13

In the provinces of Istanbul, Konya, Izmir, Eskisehir and Ankara, 28 private kindergartens which are affiliated to the Ministry of National Education and which stated that they conduct applications based on the Reggio Emilia approach were reached. A total of 20 teachers from seven different schools who accepted to participate in this study were included (see Table 1). Three of these schools are in Istanbul, three in Ankara and one in Izmir. Lincoln and Guba (1985) recommend continuing to collect data until data saturation were reached. In this regard, the data collection process continued until the data saturation was reached toseek answers to the research questions.

In the current study, to ensure the confidentiality of the participants, code names were used instead of their real names, and an informed consent form was obtained from the participants indicating that the participants would participate on a volunteer basis and the interviews would be tape-recorded.

Data Collection

In the phenomenological method, one of the qualitative research methods, the primary data collection tool is an interview (Merriam, 2009; Yildirim & Simsek, 2013). Semi-structured interview technique is preferred as it provides flexibility as well as a certain level of standard for the researcher (Turnuklu, 2000).

The semi-structured interview form used in the current study included questions to elicit personal information of the participants and interview questions to serve the purpose of this study. The participants answered the personal information questions before the interview. The semi-structured interview was grounded on the basic question, “If we consider Reggio Emilia teaching as a journey, how was the journey?”. The principles regarding the creation process and implementation process of the interview form were explained in the credibility section. These interviews were recorded by recording with a device, which is one of the two basic methods followed in recording the interview data (Yildirim & Simsek, 2013). The interviews were conducted as first and second interviews, each lasting for 12 to 60 minutes; nine hours 31 minutes and five seconds in total.

Data Analysis

In qualitative research, the data analysis process includes the coding of the data, the presentation of the categories that are formed as a result of combining the codes by taking similar features into account in figures, discussions or tables, and the explanation of the final results (Creswell, 2013); that is, the process of reporting of the data by making sense of it (Merriam, 2009). Especially in phenomenological studies, the aim is to predict the reasons behind a phenomenon by reaching the structural definition of the phenomenon experienced by the participants and to emphasize the phenomenon (Moustakas, 1994).

In the current study, interview records were listened to and transcribed in order for the data collected during this research to be ready for analysis. An interview transcript was prepared for each of the 20 participants. The data set consisted of 134 pages was coded word by word, line by line, event by event according to İnvivo coding strategies (Charmaz, 2006; Glaser, 1978, Strauss & Corbin, 1998). The coding process was carried out systematically for each interview transcript. The categories were reached by grouping the codes having similar features from among the codes extracted from the interview transcripts. During the analysis, where necessary, sound recordings were examined again and controls were made. Necessary changes were made according to the controls and agreements. During the formation of all the codes and categories, three different coders worked separately: one of them was the researcher, another one was a preschool education expert who had a course on the Reggio Emilia approach during his/her graduate studies and the other was an experienced measurement and evaluation specialist in the qualitative research process and then they presented their codes. Through discussion, an agreement was reached on different codes. For example, one of the codes proposed by the researcher as “Feeling incomplete” was coded as "Being aware of your deficiencies" by another coder. As a result of re-reading the data and discussions, the name “Noticing deficiencies” was given to this code. By reviewing the relationships between the categories, as a result of the data analysis, the theme of “Being a Reggio Emilia Teacher”, which is an upper level, was reached. The appropriateness of the theme reached was discussed with three experts (one expert in preschool education, one expert experienced in qualitative research and one expert in measurement and evaluation).

Credibility

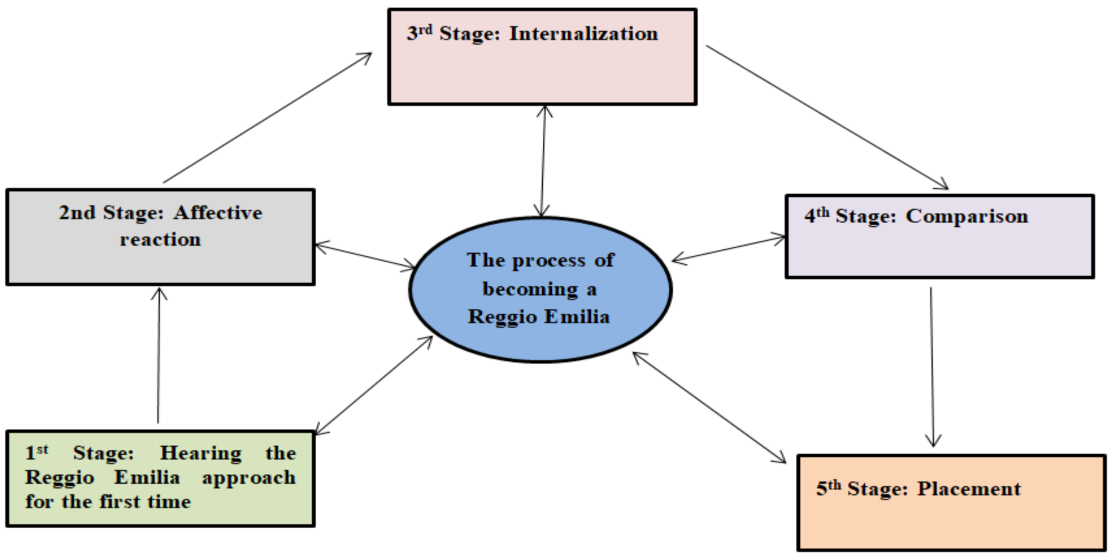
Various strategies were applied to ensure the credibility of the study: 1- Expert opinions were taken in the creation of the data collection tool, and the final version of the data collection tool was given in light of expert opinions. In the analysis of the data, a consensus was achieved in the coding process by working with three different encoders (“External control/External coder” and “Peer review” Creswell & Miller, 2000). 2- The pilot application was carried out and before the interview with the participants, the researcher noted their thoughts on the approach, avoiding any expressions that might direct the participants during the interviews (“Explanation of research prejudices”, Creswell & Miller, 2000). 3- During the data collection, the interviews were tape-recorded with the consent of the participants and all words, including pauses and exclamations of the participants, were transcribed (“Tape-recording,” “Detailed document”, Silverman, 2005; “Enhanced description”, Creswell & Miller, 2000). 4- To establish a relationship between the researcher and the participant and to ensure long-term participation, the schools were visited before the interviews and time was spent with the participants, and social bonds were established by chatting about their daily experiences (“Long-term participation and continuous observation”, Creswell & Miller, 2000). 5- The data were presented to the reader through direct quotations without comment and in accordance with the nature of the data (“Enhanced description”, “Negative situation analysis” Creswell & Miller, 2000). As these processes were considered to be important in terms of strengthening credibility in qualitative research and strengthening the basis of the research, all of them were conducted with great precision. The raw data and the analyses having been conducted were kept by the researcher under appropriate conditions.

Findings

The changes that teachers underwent during becoming Reggio Emilia teacher emerged in a 5-stage period. These are; Hearing of the approach for the first time, Affective reaction, Internalization, Comparing and Placement (see Figure 1).

Figure 1.

The Process of Becoming a Reggio Emilia Teacher



1st Stage: Hearing the Reggio Emilia approach for the first time

The category of hearing of the Reggio Emilia approach for the first time explains where and how the participants heard of the approach for the first time. The process of being a Reggio Emilia teacher started for the participants with their first encounter with the approach. The codes of this category are given in Table 2.

Table 2.

The Participants' Opinions about their First Hearing of the Reggio Emilia Approach

Category	Codes
1. Hearing of the Reggio Emilia approach for the first time	In the pre-service education period In the institution where they are still working with their own research

It was determined that the participants who encountered the Reggio Emilia approach during the pre-service education period learned about the approach in their lessons during their undergraduate education. On the other hand, the majority of the participants seem to have never heard of the approach until during job interviews or after starting work. In addition, some stated that their principals at the school where they were still working gave information about the approach. Excerpts from participants regarding this finding are given below:

> I've heard about this approach before, but frankly, I didn't know anything about it; I worked in America for years. I heard of it during my education in America. I studied child development there. While learning different approaches there, we learned this like Montessori (Lale).

> At the university… while studying, this school was always given as an example to us, we were always said, "you should see the Reggio Emilia practices at the school, go and experience it (Melike).

> Ummm I heard about Reggio Emilia at this school first (Neriman).

> I first encountered it here. Here I learned from our school principal (Canan).

Esma, Guzin and Ediz, who did not graduate from the department of pre-school education, stated that they heard about the approach at the school where they were currently working. Esma, a graduate of the department of English language literature, stated that she had not heard of the approach before and learned the approach by experiencing it when she came to the school where she was still working. Guzin, a graduate of the Department of Psychology, stated that she had not heard of the approach before and that she heard about this approach when she came to the job interview at the school where she was still working. Another participant, Ediz, who did not graduate from the department of pre-school education, stated that she did not know anything about preschool teaching and Reggio Emilia approach when he first started work. Excerpts from the participants regarding this finding are given below:

> When I started working at this school, I learned together with children here (Esma).

> I did not know about the schools of education. I heard of Reggio at the job interview before I started working here for the first time (Guzin).

> After graduating from university, I also got my formation education.… Then I encountered with this school … I didn't know anything about Reggio I didn't know anything about kindergarten teaching … (Ediz).

While Aslıhan, one of the participants, stated that she heard about the Reggio Emilia approach through her own research and in her readings, another participant, Deniz stated that she heard of the approach in the internet. Excerpts from the participants regarding this finding are given below:

> Actually, I was reading from books, I was curious, I was reading Piaget and all of them. I also read about Reggio Emilia (Aslıhan).

> This Reggio Emilia approach was actually very interesting to me at first, one day, I saw the work done by children in Reggio Emilia on the internet and I started by researching at first (Deniz).

2nd Stage: Affective reaction

In the second category, which was determined as the second stage of the process, the emotions felt by all the participants after hearing of the Reggio Emilia approach for the first time were examined. The examined emotions were included in the category of affective reaction. The affective reaction category describes the characteristics of the participants' reactions after hearing of the Reggio Emilia approach (see Table 3).

Table 3.

The Participants' Opinions about the Stage of Affective Reaction

Category	Codes
2. Affective reaction	Hopelessness Interest and curiosity Admiration Haste Anxiety Fear Surprise

When the teachers Sinem and Aylin first heard about the Reggio Emilia approach, they felt hopeless for different reasons. Reggio Emilia thought that the teacher should have a lot of imagination. They associated being a vocational high school graduate with the lack of sufficient qualification for becoming a Reggio Emilia teacher. That is, according to the participants, the Reggio Emilia teacher was a teacher with a strong imagination and good education. In this context, the participants might develop a sense of hopelessness because they thought they were not qualified enough. Excerpts from the participants regarding this finding are given below:

> I thought I couldn't do it because it would require a lot of imagination. I thought I wasn't such a practical person (Aylin).

> When I first came, I thought I couldn't do it because I was a graduate of a vocational high school (Sinem).

Participants (Melike, Cigdem, Neslihan, Deniz and Ediz) wondered about the Reggio Emilia approach because they did not know about it. While expressing their interest in the Reggio Emilia approach, the participants emphasized that the approach was different and fun. In addition, the use of natural materials during applications was stated to be a crucial factor arousing interest in the approach. Excerpts from the participants regarding this finding are given below:

> I became interested in Reggio when I first heard about it in college because I believed that it would be really effective (Melike).

> First, I researched it; it was very interesting to see what it was like; it was really fun for me (Neslihan).

…I was very interested in bringing natural materials and nature inside. ... It was something unknown to me at first, something I was very curious about (Ediz).

…I was very interested at first, one day I saw the work done by children in Reggio Emilia on the internet and thus I started researching…. Even the environment where the children were intertwined with nature had a great effect on me (Deniz).

When the participants (Canan, Aslıhan and Kadriye) first heard about the Reggio Emilia approach, they showed admiration for the physical and emotional environment, the children's freedom, and taking the children's interests into account. Excerpts from the participants regarding this finding are given below:

…when I came to the job interview, it was the Reggio system that impressed me the most (Canan).

When I saw and read about it in the book first, I thought it was a good approach. The children's freedom, especially impressed me (Aslıhan).

I think pre-school education should be designed considering what every child can do and their interests. Frankly, I was impressed when I heard that Reggio Emilia also thinks like this. I loved it when I saw the children's work (Kadriye).

Esin and Leman stated that they were worried because they were moving from the traditional system to a different system. Excerpts from the participants regarding this finding are given below:

When I first heard, I felt really worried because I wasn't used to it... (Esin).

At first, we felt worried, of course, because we didn't know how we could do it, what would happen because we got used to the classical system and we had been using it for years (Leman).

When the participants (Cigdem, Meryem, and Guzin) first heard about this approach, they felt anxious for different reasons. It was observed that these participants reacted anxiously as they had not received training on the approach before and as they would be involved in a different system. On the other hand, the participants (Canan, Ozlem, and Esma) responded with fear when they first heard about the approach due to the lack of experience and not knowing the Reggio Emilia approach. Participants (Feride, Nurcan, and Neriman) stated that they reacted with surprise because they had not heard of the approach before and thought it was not common. Excerpts from the participants regarding this finding are given below:

It was obviously a cause of anxiety for me to be in a very different system like any individual. You know, it really creates anxiety (Cigdem).

Since I had no previous education, I thought for a moment if I could do it when I first heard about it, I was worried (Guzin).

When I first came, it seemed very complicated to me (Meryem).

Iıı at first I was afraid (Canan).

I came here by taking a radical decision. I was already a foreigner to the field and when I heard a name called Reggio Emilia, I was afraid of how to do it (Esma).

> Although I came here with a university degree, I felt some fear; I think it is also true for all teachers (Ozlem).
>
> When I first heard about it, I was a little surprised as the name was foreign, but I couldn't refuse because I wanted to work here anyway, I accepted (Feride).
>
> At first, I was surprised because I came here to apply to an ordinary kindergarten (Neriman).
>
> I was highly surprised at first. I heard about Montessori before but the name Reggio Emilia was completely new to me (Nurcan).

3rd Stage: Internalization

In this category, which was determined as the third stage of the system, the participants' processes of understanding the characteristics of the Reggio Emilia approach were examined. This stage began as a process with the participants making applications based on the Reggio Emilia approach. The codes of this category are given in Table 4.

Table 4.

The Participants' Opinions about the Stage of Internalization

Category	Codes
3. Internalization	One's recognizing his/her deficiencies Conducting research Receiving in-service training Discovering Having difficulty Enjoying One's developing the belief that he/she can do Feeling relaxed Increasing experience

The participants (Neriman, Aylin and Guzin) recognized their deficiencies in various subjects when they started to make applications based on the Reggio Emilia approach. When the situations that the participants noticed were examined, it was seen that they used too many imperative speeches with the children, they remained inadequate in classroom management, and the children were given too much guidance during their studies. During the internalization stage, the participants also stated that they did research to improve themselves professionally. Excerpts from the participants regarding this finding are given below:

> When you are inexperienced, you don't know what to do; thus, you let children free and you can't provide adequate guidance (Neriman).
>
> I noticed that I was not good enough in classroom management (Guzin).
>
> I used to use too many imperative modes… I had great difficulty in giving it up … And I also recognized that I used the expression "well done" very often … (Aylin).

> I started by researching and of course I would like to have gone to Italy. This year, I am researching more intensely and I am also looking for the projects (Deniz).

> I am doing my job with great pleasure and although I like it and I do a lot of research, I frequently question whether I am doing right and I wonder if this is the best if different methods could be better or could it add more to the child (Ozlem).

> I wonder what I can do more. What did they do? I watched videos and researched about it. Those investigations are still not over. I am constantly searching to see if there is anything new in every new topic, new theme, even with numbers (Melike).

Participants stated that they improved themselves by taking in-service training in their applications based on the Reggio Emilia approach. It was observed that the Nurcan teacher, one of the participants, cared more about children's being able to choose the materials they wanted and using more materials during the activities after receiving in-service training. On the other hand, it was seen that the teacher Esin received in-service training by reading the articles brought by the school principal and by other teachers' preparing presentations within the framework of the determined subjects and sharing them with other teachers. In addition, they stated that they benefited from these training in the process of understanding the approach as follows:

> As we started to get training gradually, we increased the number of materials, and we asked children which materials they would like to use (Nurcan).

> Here, the in-service training is given by Ms. Ceylin, our school principal, she reads articles, we prepare presentations and present them to all teachers, in turn, we learn something; as soon as I got the job first, I prepared the first Reggio Emilia presentation (Esin).

Stating that working in a kindergarten as a branch teacher made them feel uneasy, the teachers Deniz and Ediz emphasized that they learned the approach through experience and in-service training. When the demographic information of the participants who stated that they received in-service training is examined, it is seen that they work in the same school. The participants' opinions about this finding are as follows:

> …You do not know how to behave with kindergarten children, you have received your education, we are receiving additional training about child development, but you still feel a little anxious because we are branch teachers. But over time, both by living and learning, children learn and we learn (Deniz).

> We had an intense Reggio seminar; think of it like an apprenticeship by seeing and applying it in class. Now, Ediz, here we will do this, we will do that, we will make a nature trip, we will talk to children like this, etc (Ediz).

Participants made sense of the approach by exploring it from various aspects. These explorations were personal and also symbolize the characteristics of the Reggio Emilia approach. The participants' opinions about this finding are as follows:

> In the first meeting, the teacher Melik said something to me; he asked, "What kind of an approach do you offer to children as education?" Of course, I directly said through trial and error. Actually, Reggio Emilia is already based on trial and error, but I didn't know it had a name (Esin).

> It is a bit like a riddle, it gives you more pleasure, and then I realized that the children learn more, they get involved more like a cook, so they are more involved (Kadriye).

Esin, one of the participants, thought that in the Reggio Emilia approach, children learn by trial and error. The teacher Kadriye, on the other hand, mentioned that she discovered that the approach is child-centred and that she enjoyed seeing children experience more effective learning. Different from these views, it was seen that the teacher Canan noticed that teachers who did their job well had already done similar practices. According to the teacher Deniz, in schools that give their education based on the Reggio Emilia approach, teachers do not do the work instead of children and children are not intervened not to prevent their creativity. The participants' opinions about this finding are given below:

> For example, the teacher is doing something, but he/she doesn't know that it is Reggio … In my high school, my teacher taught me a lot of things; now I have realized that everything I do is from Reggio, yes I was already doing it before and I have only learned that it is Reggio (Canan).

> If the child cannot do, let the teacher do it for them; this understanding is dominant in many ordinary kindergartens. There is no such thing in schools that adopt approaches like Reggio Emilia. You do not interfere with the painting that the child makes because it limits creativity (Deniz).

> I noticed that Reggio's not being a very structured system facilitates the participation of people out of the field … It seemed easier to adapt as the curiosity of the children determines what to do in Reggio (Guzin).

The teacher Guzin noticed that the unstructured program is a characteristic of the Reggio Emilia approach. In addition, she thought that the process that progresses based on children's curiosity in this program facilitated the participation of teachers who are not familiar with the program. It was seen that the teacher Lale realized how important it was to question the Reggio Emilia approach.

> Inquiry comes to the fore, I can say. That is, I have understood the importance of inquiry… That is, there are no certain rules, so students can ask questions, for example, "Why is it so? "Why should it be like this?" The teacher does not impose anything on children. They can question everything (Lale).

> I really grew up, according to Reggio, because I was in the water, in the mud, in the trees, in the leaves, and I wanted to learn about everything I saw. You know something was coming out. Here, too, when something comes up from our students, I remember my childhood while doing research with them, and this means extra excitement and peace (Cigdem).

The teacher Cigdem associated the active use of nature in education by the Reggio Emilia approach with her own childhood. In addition, emphasizing the curiosity to learn in the natural environment, she stated that she felt excited and peaceful when children conducted research with curiosity. Similar to the teacher Cigdem, Meryem, who emphasized nature, expressed that children's being distant from nature as a wrong approach.

> It is wrong for me for children to move away from naturalness and engage in something artificial. Playing with natural things like mud, sand and playing in the garden because that's how it was in my childhood (Meryem).

Differing from the above opinions, the teacher Neriman realized that children should not be guided. She also stated that children learn better by conducting research. Her opinions about this finding are as follows:

> *When I was inexperienced ... I was somehow directing them. For example, I used to say "draw a square", but then I started to understand the importance of what children thought, what shape they thought, what shape they wanted.... I noticed that there is a lot of difference between what they researched themselves and what we taught. Just as we understand better when we do it ourselves, children feel that they can do it when they research, and it really stays in their mind (Neriman).*

During the process of being a Reggio Emilia teacher, Neslihan, Aylin, Guzin, Canan and Esin stated that when they started the application process, they had difficulties in creating a project process according to children's interests, making preliminary preparation as they were inexperienced and did not understand the fundamentals of the approach. Participants' opinions about this finding are given below:

> Of course, when I first started, I was a little bit like shaken, but then I found it simple, very fun and enjoyable (Neslihan).

> It's difficult to be a teacher. But I'm never too tired, I'm just at the very beginning, and I think I have a lot to learn. I always say that it is a very difficult but very enjoyable job. First, your preliminary preparation should be very good (Aylin).

While the teacher Neslihan experienced difficulties in the beginning, she then started to find it an enjoyable, easy-to-apply and entertaining approach. Aylin stated that she had difficulties due to her lack of experience and the need to make preparations in the mornings. She also stated that it is difficult to be a Reggio Emilia teacher due to the different jobs they do, such as sticking images on the classroom doors according to the subject of the day, preparing brainstorming questions and preparing an art workshop to arouse curiosity in children.

> What is difficult is that you will actually adopt Reggio first. When you don't adopt it, you may ask yourself, what does this child understand from wood? Or playing with mud, you may tell what disgusting thing this kid is doing (Canan).

> Our new teachers here feel stunned when they come first, but I think that there is an education system (Reggio Emilia) that opens up as you experience it... I had a little hard time when I first came, of course, due to lack of experience (Esin).

> Since I am not doing my own profession, I cannot say that my motivation is very high and that I enjoy it very much. Frankly, I have difficulties ... Difficult, as the wishes and ideas of each child must be valued individually and projects must be planned according to their interests (Guzin).

According to the teacher Canan, it was seen that adopting the Reggio Emilia approach was important in making sense of children's behaviours and functions of materials. The teacher Esin also emphasized that similar to the opinion of Aylin, the lack of experience can be a cause of the difficulty. In addition, listening to children and planning projects according to the interests of children in the Reggio Emilia approach were other issues where she had some difficulties.

The participants stated that they started to enjoy the activities over time. They also stated that they developed a positive perspective towards the profession and that they were more creative. Excerpts from the participants about this finding are given below:

> …then it came out to be a very simple, fun and enjoyable approach … It is really funny and enjoyable. You are not tired at least. Doing something with natural things gives people pleasure (Neslihan).

> you love the profession more. Instead of always telling children, "stop and sit down", "why did you do it?" etc., you are funnier; you are enjoying the process more, you are more creative; you also feel excited about the possible outcomes of what has been done. You feel excited (Kadriye).

As the participants increased their knowledge of the Reggio Emilia approach and started to implement it, they developed the belief that they could do it. The participants developed the self-confidence that they could apply this approach by feeling themselves competent and expressed their relief. Excerpts from participants about this finding are given below:

> The teacher Banu said, "let's start and try". We started in this way; it was a summer school here. After that, when I got into it and saw that it was such an enjoyable job, that it was very different from normal kindergarten teaching, I believed in myself and agreed to stay here (Aylin).

> The story of Reggio is also very impressive. When you listen to it, you want to say what people have done and want to do more (Melike).

> …In fact, when I realized that Reggio is something coming from our inner worlds, I became more open to learning with this ease and comfort (Cigdem).

> I was relieved both by this school and with this approach, that is, I think it is flexible and that is very ideal for children in this age group with that flexibility and comfort in planning and I think learning occurs that way (Lale).

When the opinions of the participants (Cigdem and Lale) were examined, it was seen that the anxieties they initially felt turned into relief when they saw that the approach is suitable and useful for them. The participants (Aslıhan, Sinem, Neslihan and Nurcan) stated that their experience increased over time and this increase of experience contributed to them. Excerpts from participants about this finding are given below:

> Over time, of course, I became more experienced. I have understood better (Aslıhan).

> Then I got used to the name, got used to the approach. I'm in now; I'm learning I'm still learning; it is so enjoyable (Neslihan).

> Well, I am very happy, believe me, this place has contributed so much to me; we have learned so much that I am very happy to be here (Nurcan).

4th Stage: Comparison

The category of comparison explained the comparison made between this new system and old systems or different approaches concerning the program, teacher and student after the participants absorbed the approach (see Table 5).

Table 5.

The Participants' Opinions about the Stage of Comparison

Category	Codes
4. Comparison	Flexible plans
	Planning according to the developmental characteristics of children
	Planning according to the individual differences of children
	Planning according to the interests of children
	Giving more importance to transitions between activities
	More enjoyable education and instruction
	Making more observations
	Working more in smaller groups
	The teacher's getting to know the child more closely
	The teacher's acting together with the child
	Higher workload
	The progress of the process according to the curiosity of children
	Opportunities provided to be exposed to information in different ways
	The most adopted and efficient approach
	More first-hand experience
	More suitable for Turkish culture
	More creative, social and active children

The teachers Melike and Cigdem stated that they had stress about developing a plan in the school where they worked before, that they progressed step by step by following the plan, and that children being a participant in their decision-making process was not considered important. On the other hand, they mentioned that the plans in their current schools were flexible, the process was directed according to children's interest (children participating) and in this way the education process became more enjoyable for the child and the teacher, and teachers' anxiety about keeping up with the given plans was eliminated. The participants' opinions about this finding are given below:

> Every child had books to finish in the school where I worked before. This creates stress and pressure on the teacher after a while (Melike).

> Previously, it was as follows; I should cover the subject in the curriculum; let's do another activity here… rather than giving something through activities, now it becomes more enjoyable to teach based on the things children feel curious about (Cigdem).

During the planning process, the participants stated that they used to prepare the plans in their previous schools in a uniform, detailed manner and without considering individual differences, and even they used a ready-made program, whereas they prepared plans in their current schools by paying attention to development levels of children, transition between activities and individual characteristics. Participants' opinions about this finding are as follows:

> We were making plans beforehand; there were conceptual conversations, we were talking about something and then forgot about it … Here we go into a little more detail now while making our plans (Nurcan).

> We don't use ready-made plans because the development process of each child is not considered separately in ready plans. I am not showing how to draw the number 1 to children anymore; rather, a child is highly interested in body movements; thus, I let him/her lie down and another child lies next to him/her and then they make the number 1 with their bodies (Esin).

Participants stated that their workload was higher than before due to reasons, such as planning and documentation. The comparisons made by the participants (Melike, Nurcan, and Deniz) in terms of taking individual differences into consideration, working in smaller groups and making more observations are as follows:

> There are also people who have passed to reading and writing with sound studies. But there are also children who cannot hold a pencil yet. I can't use the same activity with all of them … (Melike).

> As all the education is given to these children by the pre-school teacher, including eating and toilet, he/she has to follow and observe them closely … He/she should know, for example, the content and objective of a game. He/she listens to them while they are playing; they are communicating with their friends. While these are important for the kindergarten teacher here, they are not important for teachers working in ordinary kindergartens. They do not know what children are doing why they are playing; they are playing and that is all (Deniz).

> …more intense because we go into a lot of details, we write the plan every day, but the National Education teachers usually have ready-made plans (Aslıhan).

> We have an intense program … There are forms we need to fill in; we are constantly observing the children. We need to fill in the observation form in the room we call BDC. About their chosen corners, attitude, friends, etc. (Melike).

> In my other school, I was spending more time on activities, such as cut and paste. We used to be busy with such activities there and here we are busy with observations and reports (Cigdem).

It was seen that the participants made comparisons regarding the education process. The teacher Aslıhan stated that the education process at the school she worked in before was much more focused on academic skills, and stated that in her current school, it was progressing in a way that allows children to question what they were curious about and gain versatile knowledge and skills. Participants' opinions about this finding are as follows:

> In a normal program, the digestive system is taught, but here it naturally emerges as you and children wonder about something and this is more natural and better (Cigdem).

> The place where I worked before was more focused on education (Aslıhan).

> Before, I was giving paper for handcraft activities to everyone; to cut and paste, for example… The products we previously posted on the board seemed to come out of a single source. But here,

> children use the materials they want to create different...; same activity but differently designed products (Nurcan).

The teacher Nurcan made a comparison with her old school and stated that she had all children in the classroom do the same activities with the same materials before, but in the activities in this school, children are free to choose materials and they are allowed to create different products. Different from these views, the teacher Ediz compared the Reggio Emilia approach with other approaches. He stated that the approach he found the most efficient is the Reggio Emilia approach as follows:

> There is High Scope that we learned before, when I know this, I know all of them. Think Pyp as a roof, there are all approaches in it, but the approach that I found the most efficient is Reggio (Ediz).

The participants (Nurcan, Leman and Esin) compared the Reggio Emilia approach with the different features of the Montessori approach. It was stated that the Montessori approach is known more and the teacher's classroom role and the place of individual activities in these two different approaches were compared. The participants' opinions about this finding are given below:

> Montessori is known a little more (Nurcan).

> Reggio Emilia is not heard much in Turkey, there is always Montessori … In Montessori, the teacher is passive; the child is doing and the teacher is monitoring but in Reggio Emilia, the teacher learns with the child in every learning process. Here, while the child is surprised by something, the teacher is also surprised, because the teacher always feels the same as the child, he/she can get to know the child better (Esin).

> In the Montessori method, children play individually with something in front of them … But this approach suits me better because children can become more sociable and creative (Leman).

After they started to conduct Reggio Emilia approach-based applications, the participants stated that they used more natural materials, and continued education in such a way as to cater to the interest of children, made children more active and thus they gained more first-hand experience. Participants' opinions about this finding are given below:

> Really, this system is better because the child sees, learns by touching ... they are more active… I think it is a nice system because children learn by experiencing (Aslıhan).

> Everything is natural, the child learns metal, learns wood, that is, he/she learns everything that is a natural material. Even the bark of the tree, they explore it by touching and examining the texture; there is no such opportunity in other schools (Deniz).

The teacher Cigdem compared the Reggio Emilia approach to childhood experiences in Turkish culture. She stated that children in Turkey play games together in nature. She likened the streets of Turkey to the piazza area in the Reggio Emilia approach and stated that the approach is suitable for Turkish culture. The participant's opinion on this finding is given below:

> Since our childhood was spent outside, I do not think it is a program unsuitable for Turks, especially since the piazza area in Reggio is such an environment (Cigdem).

5th Stage: Placement

The 5th stage of the process of becoming a Reggio Emilia teacher, the placement category explained the characteristics of the changes that occured in participants' perspectives and practices, as well as their incorporating the approach into their lives (see Table 6).

Table 6.

The Participants' Opinions about the Stage of Placement

Category	Codes
5. Placement	Incorporating the approach into the daily life Adopting the approach as a philosophical approach Ownership Placing into the work environment Learning to listen Making use of the environment and nature Believing that learning occurs in nature and with natural materials Accepting each child as an individual Evaluating each child as a unique being Considering oneself as a learner Understanding the importance of asking question

The teacher Cigdem stated that she placed the Reggio Emilia approach in her daily life and collected materials for projects carried out outside the school. While asking questions to children in the past, now, she has experienced changes, such as listening to questions from children and using the environment and nature more so that they can find answers to their questions. The teacher Esma, on the other hand, stated that she experienced many changes during the implementation phase, looking from a more general perspective. The teacher Deniz, on the other hand, emphasized the significance of the environment in the Reggio Emilia approach and stated that she owned the art workshop opened in her school this year and she was happy there. The participants' opinions about this finding are given below:

> For example, we went on vacation with my husband at the weekend; there was a project that we were conducting. From there, I collected a lot of different pieces of branches, stones, leaves that I thought would be useful (Cigdem).

> Many things have really changed; the perspective has changed; the materials I use have changed, in that sense, of course, many things have changed (Esma).

> Also, you should have a place to work; I did not have a workshop last year, there was a small piazzana area, it was my workshop, which could not be called a workshop anyway. You know, the workshop system in Reggio is very important, very valuable. They provided such an opportunity this year, now it is a great place (Deniz).

The teacher Ediz stated that she had adopted natural life as a teacher who had been working for ten years in the school, which used Reggio Emilia approach. In Melike teacher's perspective, changes occurred in subjects, such as accepting each child as a separate individual, evaluating according to individual differences, and seeing herself as a student. These participants stated that they were happy in this school as follows:

> I think it is a philosophical thing, humanity already belongs to nature, since we belong to nature, learning also takes place in nature, it takes place through nature (Ediz).

> You are very happy when you feel the difference in children. Moreover, you do not compare the children with each other (Melike).

> To answer everything with a question. We do the same to students here. When children ask something to us, we ask them "what do you think?" This is one of the biggest differences. That is, not to try to mould children … I feel happy while coming here (Neriman).

Discussion and Results

As emphasized by Paulo Freire (1968) in his book "Pedagogy of the Oppressed," it is expected that democratic pedagogies that support respect and participation in education will increase and that teachers will change in this direction. However, this respect and participation should not be a gift offered by teachers but should result from the mutual agreement in communities. While in traditional kindergartens, result evaluation and ready-made programs direct education, in Reggio Emilia schools, humane education, self-expression and communication as an indicator of freedom, educational research, participation, personal development and pedagogical documentation are accepted as values and direct education (Malaguzzi, 1998; Rinaldi, 2006). All teachers who are in the process of becoming Reggio Emilia-inspired teachers are expected to internalize these values and experience change in this direction. Although education is shaped by our worldview, values and beliefs, the change process and professional development in teachers seriously shape education. In this connection, in the current study, the process of becoming Reggio Emilia teachers of 20 participants working in Reggio Emilia-inspired schools in Turkey was investigated and it was revealed that these teachers underwent a 5-stage change process. These stages are; "Hearing of the approach for the first time", "Affective reaction", "Internalization", "Comparing" and "Placement".

This change process begins with the first encounter of the participants with the approach. When the opinions of the participants have been examined, it has been seen that 12 participants heard about the approach during job interviews or after starting to work. This might be because their field of graduation was not pre-school education and they hold a high school degree or an associate's degree; thus, they might not have taken any course on different approaches used in pre-school education. On the other hand, two participants stated that they had never heard of the approach before although they hold a Bachelor's degree in pre-school teaching. This might be because they did not have any training on the Reggio Emilia approach or even if they had, the lessons were not very effective. In the study conducted by İnan and Kayir (2015), their findings showed that the teachers learned about Reggio Emilia approach during their undergraduate education, but they saw its application for the first time during the study. Parallel to this finding, some participants stated that although they knew what the Reggio Emilia approach is, they, for the first time, experienced its application in the current study.

The participants who encountered the Reggio Emilia approach for the first time stated that they gave different affective reactions, such as interest and curiosity, anxiety, concern, fear, astonishment, despair and admiration in the next stage. When the opinions of the participants are examined in general, it can be said that the basic features of the approach, such as the freedom of children, planning the process according to their interests, and using nature and natural materials, are the most attractive features of the approach for the participants. In addition, these basic characteristics caused affective reactions, such as admiration and interest-curiosity in the participants. According to the participants, the beliefs that the Reggio Emilia teacher should have a lot of imagination and should receive a good education and lack of training and experience about the approach and its being different from ordinary systems caused affective reactions, such as despair, haste, anxiety and confusion in the participants. It was observed that the participants who gave negative reactions, such as anxiety, hopelessness, fear and haste, did not receive training about the approach in their pre-service education or did not graduate from any of the departments related to pre-school education. It is observed that the lack of education and being unfamiliar with the field negatively affected the feelings and thoughts of the participants about the approach. On the other hand, it can be thought that the positive reactions of the participants, such as admiration, interest and curiosity, are because of their being experienced in their fields or their having graduated from the department of pre-school teaching. To our knowledge, no similar research has been found on this subject in pre-school education; however, in the study conducted by Bastug (2015) regarding the emotions and changes experienced by primary school teachers in the primary reading and writing teaching process in primary education, the teachers' first experiences of teaching reading and writing were staged as decline and rise. In this process, teachers had experienced, such as fear, stress and anxiety at first, and then these experiences transformed into happiness, socialization and self-confidence as they gained experience. Concerning transformation, it can be said that the findings of this study coincide with the findings of the current study.

In the internalization category, which is the third stage of the process of becoming a Reggio Emilia teacher, it was observed that the participants started to make applications based on the Reggio Emilia approach. In this process, learning and structuring of the approach occurred. It was concluded that they made sense of the approach by experiencing it, recognizing their shortcomings, exploring, doing research, experiencing difficulties, receiving in-service training, enjoying, relaxing, developing the belief that one can do it, and increasing their experience. The most important factor in the change of the participants who started to explore the different features of the approach was their having in-service training because the participants made sense of the approach more easily by getting information about the approach through in-service training. In-service training makes it easy for teachers to closely follow the developments in their field, to acquire new knowledge-skills and to integrate the knowledge-skills they have acquired into the education and training process (Kayabas, 2008). In addition, in the Reggio Emilia approach, it is seen that the professional development of teachers is very important and especially time is devoted to teachers to achieve this development (Malaguzzi, 1998).

The participants compared the approach with other approaches and their own previous teaching experiences after the assimilation stage in the process of becoming a Reggio Emilia teacher. When the characteristics that were compared were examined in general, it was seen that the child image, the role of the teacher, the environment, cooperation, project and documentation process were compared. In fact, this stage may be an indication that the participants have understood the principles of the approach. It can also be said to be important in seeing the change individually. While making comparisons, the teacher, program and student dimensions were considered. In the teacher dimension, it was concluded that the workloads of the participants were higher than the previous ones due to reasons, such as paying more attention to students during the adaptation process, planning, documentation, parent meetings and school meetings. In the program dimension, it was concluded that the participants paid more attention to the developmental levels and individual characteristics of the children by giving more importance to pre-preparation and transitions between activities while preparing their plans, they were more flexible in practice, they made more small group works and more observations. In addition, the participants stated that the Reggio Emilia approach is less known in Turkey compared to the Montessori program and that in the Reggio Emilia approach, the teacher acts with the child instead of observing the child and gets to know the children more closely, while the children are more active, creative and more social. Sahin-Sak (2014), in their study investigating pre-service pre-school teachers' views on the Montessori and Reggio Emilia approaches, stated that the Reggio Emilia approach supported creativity, but such support was not observed in the Montessori approach.

In the final stage of the process of becoming a Reggio Emilia teacher in the current study, the participants adopted the environment in which they worked and made many features of the approach their own principles. However, only six of the 20 participants who participated in the study reached the stage of placement. The other participants remained in the comparison stage and are still continuing their process of becoming a Reggio teacher. It was observed that the participants who could not reach this stage were just at the beginning of the transition in their school or did not receive training from experts. This lack of training may indicate that they have not fully understood the principles of the approach. The participants who were able to reach to the stage of placement are seen to have received training and gained experience on the Reggio Emilia approach. In addition, when the common characteristics of these participants are examined, it is seen that all of them are in the same school. In relation to the organizational culture, it can be said that getting education from experts and institutions in the field helps teachers to change their perspective in the process of becoming a Reggio Emilia teacher, to adopt the approach and to see the change in themselves clearly in terms of understanding and applying the approach.

When the stages through which the participants underwent in the process of becoming Reggio Emilia teachers are examined in a holistic manner, it is seen that the participants gained experiences that would enrich the education and training process and their emotions showed a trend from negative to positive. In this context, it can be suggested that experts and institutions should provide training for teachers in schools that make applications based on the Reggio Emilia approach and that teachers should be given detailed training on project studies due to the differences in the implementation process of projects based on the Reggio Emilia approach. In the current study, a system consisting of five stages regarding the changes teachers experienced during the process of becoming a Reggio Emilia teacher was reached. It can be investigated whether other teachers who make applications based on the Reggio Emilia approach go through the same processes. To our knowledge, no research has been found in the literature showing that pre-school teachers experience a gradual process of change in their process of becoming Reggio Emilia teachers. In this context, the current study is thought to contribute to the field.

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Collaborative Action Pursuits within EFL Task-Based Peer Interactions*

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Abstract: This study aimed to unveil collaborative actions in EFL task-based peer interactions. Collaboration in peer interaction has been mainly investigated by analysing language-related episodes (LREs). Assuming that an etic coding would limit the understanding of collaborative actions, a qualitative analysis of learner interactions, particularly sociocultural discourse analysis, was adopted for this study. The data include 11 hours of peer interactions collected from a speaking club designed as an extracurricular activity. The participants were 15 adult learners enrolled at a language school of a Turkish state university and they were informed to have B1+ proficiency level. The learners were grouped into three groups and assigned to complete two language tasks: divergent and convergent tasks in L2. The interactions were recorded, and by employing the constant comparative method, all the collaborative actions were identified in the data. Two broad categories of collaborative actions emerged; language-related and task-related, each of which has different subcategories. In this paper, the language-related collaborative actions, which are eight in total, are defined and exemplified with extracts from the data. The results present implications for the inclusion of peer interaction activities, especially in EFL contexts where learners have limited opportunities in participating in L2 interaction.

Keywords: Collaboration; peer interaction; L2 tasks; sociocultural theory; English as a foreign language (EFL)

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Introduction

Peer interaction is described as "*any communicative activity carried out between learners, where there is minimal or no participation from the teacher*" (Philp et al., 2014, p.3). It allows for different types of language use and practice, and provides a context that facilitates learning in which learners experience greater comfort levels (Sato & Ballinger, 2016). Peer interaction activities create more opportunities to speak and participate in social interaction, especially in foreign language (L2) contexts where learners have limited opportunities to participate in meaningful interactions both inside and outside the classroom (Sato, 2013). Although there has been an increasing interest in investigating peer interaction since the early 1980s, it still gets less attention (Sato & Ballinger, 2016). Besides, few studies focus on peer interaction in foreign language classrooms than in second language classrooms (García Mayo & Azkarai, 2016).

Blum-Kulka and Snow (2004, p. 291) describe peer talk as having a "*collaborative, multiparty, symmetrical participation structure*". Participants work together towards a common goal; this is the aspect that makes it a collaborative process. It is also multiparty as there are at least two or more participants involved. Lastly, it is symmetrical since all learners are equal in interaction regarding participant contributions (Philp, 2016). Similarly, L2 learner-learner interactions have been viewed as a place for collaborative construction and engagement in activities between novice and expert by sociocultural theory (SCT) (Ohta, 1995). During peer interactions, learners can solve each other's problems and co-construct new language knowledge. Co-construction of knowledge (or scaffolding) emphasises collaboration (Sato & Viveros, 2016). Interaction has been analysed as an opportunity for learners to scaffold each other and collaborate to resolve their language-related problems from the sociocultural theory perspective. Through the use of language-related episodes (LREs) (Swain & Lapkin, 1998) or languaging (Swain, 2006), learners build new knowledge by using language to think and talk about language (Fernández Dobao, 2016).

Swain and Lapkin (1998) defined LREs as "*any part of a dialogue where language learners talk about the language they are producing, question their language use, or correct themselves or others*" (p. 89). LREs are the most common analysis unit used to understand collaboration (Sato & Viveros, 2016). LREs have also been used to investigate discourse in classroom studies, especially to investigate collaborative learning and task-based language teaching (Jackson, 2001). According to Jackson (2001), research into LREs can provide fine-grained analyses of learner productions. For example, LREs, as a research tool, can help understand the nature of L2 production and explore the contributions that output makes in learning an L2.

SCT, however, has favoured detailed 'micro genetic analyses of dialogic interactions, which is why the authors believe there is a need to conduct detailed analyses of how collaboration occurs (Ellis, 2003). van Compernolle (2015) also states that L2 interaction research, drawing on Vygotskian psychology, adopts a qualitative approach to data analysis. When 'external or etic' coding schemes are applied to interactional data, there is the risk of understanding participants' orientations to the phenomena in a misleading way. It is important to have an emic look into learners' interactions to understand 'collaboration' rather than adopting etic classifications such as LREs or collaborative dialogue. This paper, therefore, aims to define collaborative discourse by conducting detailed analyses of peer interactions in EFL task-based environments rather than adopting LREs as a unit of measurement in analysing collaboration. For this aim, the following research question has been formulated: What collaboration types can be observed in L2 task-based peer interactions?

Theoretical Background

SCT, Zone of Proximal Development, and Scaffolding

According to SCT, language and communicative interaction have a primary role to mediate higher psychological functions and their development; such as the development of L2 communicative abilities, conceptual thinking, perceiving and representing things in the external world (Lantolf, 2011), development of concepts, conversational routines, cultural knowledge (van Compernolle, 2015), and the acquisition of language for communication. Two concepts, such as the zone of proximal development (ZPD) and scaffolding, are key terms to illustrate the process of development. ZPD is defined as a metaphorical distance between the tasks that a child can accomplish alone and the ones they cannot do alone, but could do with the assistance of more capable peers or adults. For example, for interaction to be beneficial for acquisition, it needs to assist the learners in constructing ZPDs achieved with scaffolding (Ellis, 2008).

Scaffolding is an inter-psychological or dialogic process. Ellis (2008) states that learners internalise knowledge with the help of scaffolding. This means a speaker (expert or novice) helps another speaker (a novice) perform a task or a skill that they cannot perform independently. Donato (1994) coined the term 'collective scaffolding', which means there is no definite expert, but rather the expert's role is bilateral (Gonulal & Loewen, 2018). In this kind of scaffolding, learners can build up ZPDs for each other and be more successful than what they would have achieved independently.

SCT, Peer Interaction, and Collaboration

Foster and Ohta (2005) argue that knowledge is not owned solely by the learner but rather a property of social settings. Similarly, cognition and knowledge are also social and dialogically constructed (Lantolf, 2012). Research on sociocultural perspectives investigates how learners assist each other through scaffolding and building knowledge together (Philp et al., 2014). This process helps learners perform at a level beyond their abilities by developing knowledge and its use. When learners from the same level collaborate, they pool their individual knowledge and resources with each other. As a result, they can solve each other's problems and co-construct new language knowledge

(Antón & DiCamilla, 1998; Donato, 1994; Ohta, 2000, 2001; Swain, 2000; Swain & Lapkin, 1998).

Sociocultural researchers suggest that co-construction of knowledge (or scaffolding) emphasises collaboration (Sato & Viveros, 2016), and the term 'scaffolding' has been used to explain peer interactions (Donato, 1994; Ohta, 2001; Swain & Lapkin, 1998, 2001, 2002). Collaborative dialogue, defined as "*dialogue in which speakers are engaged in problem-solving and knowledge building*" (Swain, 2000, p. 102), has also been used to refer to scaffolding as its nature makes it difficult to apply in peer-peer interactions (Ellis, 2008). When peers work together, they can act as both novices and experts. Therefore, they provide scaffolded assistance to each other (Donato, 1994; Ohta, 2001) because neither shares the same weaknesses and strengths with one another (Fernández Dobao, 2016). Peers can support each other by "questioning, proposing possible solutions, disagreeing, repeating, and managing activities and behaviours" within the ZPD (Swain et al., 2002, p. 173). Scaffolding is also associated with assistance, which is a feature of learner talk, claimed to promote L2 development (Foster & Ohta, 2005).

Collaboration in peer interactions has been investigated mainly by LREs or collaborative dialogue (Sato & Viveros, 2016). Several studies examined peer interactions using LREs to measure their effectiveness (Storch & Aldosari, 2013) and evidence varying degrees of collaboration by identifying and analysing LREs (Storch, 2011). Although LREs have already been categorised (Garcia Mayo & Azkarai, 2016; Ross-Feldman, 2007; Storch, 2008), identifying collaboration in line with pre-established categories would limit the possibility of collaborative behaviours since activities change when performed by different learners and by the same learners at different times (Lantolf & Thorne, 2006). Therefore, a static coding of utterances cannot grasp the dynamic nature of the talk, and it cannot show the ways meaning is constructed amongst speakers, over time, through and in interaction (Mercer, 2004).

To date, there is a scarce number of studies that focus on collaborative strategies or students' verbal behaviours during peer interactions (Beatty & Nunan, 2004; Erten & Altay, 2009; Gillies, 2006). There are also several studies in which discourse moves were identified during collaborative dialogue (Zeng & Takatsuka, 2009), LREs (Kos, 2013) or collaborative learning environments (Johnson & Johnson, 2001). The collaborative discourse moves, or strategies defined in these previous studies were specific to either computer-mediated communication (Beatty & Nunan, 2004; Johnson & Johnson, 2001; Zeng & Takatsuka, 2009) or writing tasks (Kos, 2013). Gillies (2006) did not focus on collaboration in her study. There is only one study to the researchers' knowledge (Erten & Altay, 2009) in which there was an attempt to define collaborative behaviours in a similar research context. This paper, therefore, has the potential to contribute to the understanding of collaborative discourse in EFL contexts.

Method

Participants and the Research Setting

This study is based on classroom descriptive research, which has adopted qualitative accounts of classroom processes (Ellis, 2012). The data, however, come from an extracurricular activity (i.e., speaking club) rather than participants' regular classrooms. The reason of collecting data from such a context was not to interfere with the teacher's agenda in the classrooms as they followed a predetermined curriculum and hardly allocated time for peer interactions during their regular lessons. This is yet an acceptable practise as Sato and Ballinger (2016) state that peer interaction can be assigned in any learning environment (e.g., in the classroom, outside the classroom, or in a virtual environment).

The participants were 15 adult EFL students who were enrolled in an intensive language programme at a Turkish university, and their ages ranged between 18 and 20. These learners had already enrolled in different undergraduate programmes; each required either a complete or partial foreign language medium of instruction, which was English in the current context. Therefore, all the participants had to attend a compulsory intensive English language programme before starting to take classes in their respective undergraduate programmes. At the time of the data collection, the students had already completed one semester of the intensive language program; they were all then placed in B1+ language proficiency classes by the school administration.

The participants were randomly assigned to three different groups, involving five participants in each. As they came from six different language programme classes, the randomisation method in assigning learners into the groups was favoured to spread any confounding variable's effects more evenly (Phakiti, 2014). At the end, there were three male and two female students in each group; but, due to the effect (Fraenkel, Wallen, & Hyun, 2012), the number of the participants and groups decreased by the end of the study. However, there were at least three participants in groups, and they participated in all of the data collection meetings. There were at least two learner groups that completed each speaking task.

Materials and Procedure

Two types of tasks, convergent and divergent tasks (Duff, 1986), were used to solicit meaningful interactions from the participants. Convergent tasks are coined from problem-solving tasks, and they are defined as tasks in which learners are required to converge on a single mutual correct answer (Tan Bee, 2003). On the other hand, divergent tasks resemble discussion tasks. These tasks encourage a range of possible responses, and there is not a single correct answer in contrast to convergent tasks. Tan Bee (2003) resembles divergent tasks to debates and opinion-exchange tasks. The tasks for this study were either chosen from previous studies or designed by the researchers (see Appendix A). Topic familiarity was ensured during the decision process because familiar topics help generate more discourse (Li, Williams, & Volpe, 1995) and facilitate performance (Leeser, 2007).

An ethics committee approval was first obtained from Hacettepe University to carry out the study (No: 35853172/438-2194, Date: 13.07.2015). As the study was planned to be an extracurricular activity (attended voluntarily), the first author met the learners after the language programme's regular schedule. For each meeting, all of the learner groups were distributed to different parts of the room to increase the recordings' quality. The participants of the same learner group formed a circle during their interactions to face each other. For each learner group, two video cameras and one audio recorder were used to record their conversations. A sketch of the setting can be seen in Figure 1 below:

Figure 1.

The Setting of the Groups

The first author carried out the whole procedure. Each meeting started with the setting's organisation, placing the group members and then providing task instructions. Apart from those moments, the researcher acted as a non-participatory observer and did not interfere in any group interactions. Task instructions were given orally in the foreign language (i.e., English), and then the students carried out the tasks themselves. No time limitation was set for the completion of the tasks. The duration of each session, therefore, differed for each group and each task. For instance, the divergent tasks lasted approximately 40 minutes, whereas the convergent tasks approximately lasted 30 minutes. A total of four divergent and four convergent tasks were completed by the participants. The order of the tasks and the time spent on each task can be seen in Table 1 below.

Table 1.

The Order of the Tasks

	First Group	Second Group	Third Group	TOTAL
Divergent Task 1	00:29:11	00:29:00	00:29:07	01:27:18
Divergent Task 2	00:18:40	00:28:45	00:28:13	01:15:38
Convergent Task 1	00:41:27	00:41:18	00:41:24	02:04:09
Convergent Task 2	00:35:17	00:32:24	00:34:00	01:51:41
Divergent Task 3	00:37:52	00:39:49	0	01:17:01
Divergent Task 4	00:32:12	00:25:04	0	00:57:16
Convergent Task 3	00:36:54	00:35:44	0	01:12:38
Convergent Task 4	00:35:46	00:29:51	0	01:05:37
TOTAL				Approximately 11 hours

For the first meeting, a divergent task was chosen to eliminate any possible effects of convergent tasks; for instance, the students would try to find a solution or converge on a single outcome during divergent tasks. After the second convergent task, the number of participants unpredictably decreased; therefore, it was not possible to form a third learner group. Only two peer groups completed the remaining last four tasks.

Data Coding and Analysis

The first researcher transcribed all the data following a selected list of Jefferson (2004) transcription conventions (Appendix B) to guarantee that transcribed talk includes much information relevant to the analysis and to avoid any misinterpretations (Mercer, 2004). Non-word utterances such as 'err/erm', 'oh', and 'huh' were included in the transcription when possible communicative functions were observed in the interaction. The talk in learners' first language (i.e., Turkish) was transcribed in the first language, and their English translations were provided in italic under each word or phrase. The first three letters of each participant's name were used to maintain their anonymity.

A sociocultural discourse analysis (Mercer, 2010) was adopted to pursue collaborative moments during interactions. The first author read the transcribed talk multiple times to determine possible collaborative behaviour patterns in the learners' interactions. This process enabled creating an initial collection of episodes where collaborative moments were observed in each task and each learner group. The episodes were described and given possible labels by employing a constant comparative method (Glaser & Strauss, 1967). As the coding was pursued, the new emergent codes were compared to the previous ones, and when a mismatch was recognised, a new label was given to the latest code. After several times of robust analysis, two broad categories of collaborative behaviours, language-related and task-related, were observed in the relevant context.

This paper will focus on language-related collaborative behaviours that consist of 8 different collaborative actions. The detailed explanations will be provided in the next section, where each category will also be exemplified with the extracts from relevant episodes.

When the analysis of all the transcripts was finalised, a second trained coder was invited to code part of the collection for a reliability check. The transcripts of the 4 tasks were randomly chosen out of 20 tasks, representing approximately 20% of the transcribed data. The coder and the first author coded a total of 105 collaborative behaviours out of 127 instances as identical, yielding an inter-rater agreement of 83%, which is considered an acceptable reliability rate.

Results

The qualitative analysis yielded two broad categories; (1) language-related and (2) task-related collaborative actions. Language-related collaborative actions occurred around the language issues that emerged during the interactions, whereas task-related collaborative actions appeared related to task-related issues. The number of language-related collaboration types was 8, and they were related to the resolution of any language issues (e.g., when learners struggled to find a word or provided corrections to group members' utterances). This type of collaboration also occurred around resolving any comprehension problems among learners; this was especially observed when the learners sought clarification or an explanation from their peers. Each collaboration type will be described and exemplified with a sample extract from the group interactions below.

Language-related Collaboration Types

Provision of the word/phrase: This collaboration action emerges in two different moments. The first one happens when the current speaker initiates a word search, displaying turn holding tokens (e.g., 'err'), cut-offs, and pauses, demonstrating the speaker is engaged in word search activity (Duran, Kurhila, & Sert, 2019). Lerner (1996) suggests that word search generally occurs near the end of the unit, inviting recipients to participate in the search and complete it collaboratively. The second one is observed when learners explicitly solicit L2 equivalents of the words they do not know or recall by consulting their native language (i.e., Turkish); this is also a typical feature of word search sequences where learners cannot produce the words in L2. The following two extracts describe this collaborative action.

Extract 1.

Communication with People (Divergent Task 1- Group 3)

```
1       ZUL:   I don't think  yani  online dating (1.0) not bad sometimes
                              i mean
2              sometimes bad sometimes good it depends
3       SIM:   yes
4       OZN:   but in the real life err I said err online dating is more
5              relax- şey err easier than real life for example in the
                      err
6→             online dating they err peoples are err easily (1.0) some err

7→      SIM:   communication with people
8→      OZN:   communication yes (1.0) fa- fa- different different sentences
                                       di- di-
9              (2.0) that's some reliable sentences but in real life and they
10             err meet in the park
```

In line 6, the frequent use of a hesitation marker (err) and silence (1.0) show that OZN is having a problem pursuing his turn. One of the group members, SIM, completes the turn (communication with people). OZN echoes the first part of SIM's turn (communication) and uses a confirmation response (yes). It seems that OZN can extend his turn for a further two more lines after SIM provides help to complete his utterance.

Extract 2.

Add Someone on Facebook (Divergent Task 1- Group 1)

```
1       MEV:   it's maybe err good idea because
2       OKN:   why?
3       MEV:   because
4       OKN    why
5→      MEV:   I am a man and some- somebody facebooka eklemek ne acaba
                                             what is to'add person on
                                             facebook
6       BER:   add
7       SEY:   add
8→      MEV:   add
9       SEY:   add the friends
10→     MEV:   add the friends °to me°
11      ALL:   ((laugh))
12→     MEV:   it maybe want to- want to tanışmak neydi
                                         what was to'meet'(in English)
13      OKN:   meet
14→     MEV:   huh meet meet me and maybe he can be good person and I
15             improve myself with talking with everybody thinks
```

In this particular fragment, MEV initiates a word search in line 5 (***what is to'add person on facebook***) by consulting their native language. MEV accepts the same candid answer (add) offered by two learners (SEY and BER) in the subsequent turn. Following this, the same learner (MEV) initiates another word search in L1 (***what was to 'meet' (in English)***) again, and he is provided with a candid answer by his friend (OKN). He accepts his offer and expands his turn in lines 14 and 15.

Extract 3.

You Have Never Met (Divergent Task 1- Group 2)

```
1     ARZ:  err and (2.0) er we- ((laugh)) we meet err we never meet
2           °hiç bir zaman görüşmedik°
             we have never met
3     BUR:  you never met
4     TUG:  you err never- you have never-
5→    ARZ:  never meet
6→    TUG:  MET
7→    ARZ:  met
8     TUG:  yes this is ((laughs and turns to BUR))
9     BUR:  ((laughs))
```

Reconstruction of others' turns: Collaborative actions in the form of 'reconstructions' are also observed in two conditions. When a learner uses an incorrect word in L2, other group members correct the speaker. The following extract exemplifies this particular collaborative moment.

Extract 4.

Hatay Is Near Suriye (*Convergent Task 2- Group 1*)

```
1     MEV:  hey guys what will we go
2     MER:  maybe
3     MEV:  where will we go together
4     MER:  err i think we can go to hatay
5     OKN:  hatay?
6     MER:  yeah
7     MEV:  hatay?
8     MER:  hatay is very natural and very beautiful place
9     OKN:  very dangerous
10→   MER:  ne- what dangerous?
            what
11→   MEV:  syria
12→   OKN:  it between [$suriye$]
                         syria
13    MER:               [yeah]((laugh)) but err in dörtyol err
14          doesnt near the err syria it's err near the adana
15    MEV:  but hatay is the near the [suriye]
16    OKN:                            [suriye] i agree with you
```

Before this particular fragment, ARZ has told other learners that she has a boyfriend with whom she has met online. In lines 1 and 2, ARZ seems to have difficulty constructing a structurally correct sentence, and she solicits help in a softer voice by using L1 (°***we have never met***°). Followed by a candid answer by BUR (you never met), TUG participates in the conversation and also offers a candid answer (you err never- you have never-). ARZ still has a problem using the correct expression (never meet). In the next turn, TUG corrects the incorrect conjugation (MET), and ARZ echoes the correct form.

This collaboration action is also observed in the form of a reformulation of an incorrect utterance. When a learner produces an incomplete or structurally incorrect utterance, other learners reformulate this utterance in a well-structured form. As happens in the following exchange, the learners collaboratively produce a reformulation of each other's turn.

MER offers to go to Hatay, situated in the south of Turkey and near Syria's border, after MEV's question for a possible holiday destination (err i think we can go to hatay). Neither OKN nor MEV seem to accept MER's suggestion, and OKN produces a disagreement with MER's suggestion in line 9. Followed by this, MER requests a clarification (***what***-what dangerous?). Next, MEV self-selects himself and refers to the border country (syria) which is reformulated by OKN (it between [$***syria***$]) to clarify meaning. MER accepts this in line 13 with a confirmation token accompanied by a laugh, and she then produces counterarguments to others' ideas.

Consider the following extract exemplifying how reconstructions are observed in the case of a sentence as well.

Extract 5.

Do You Use Social Media? (Divergent Task 1- Group 2)

```
1      BUR:   [are you] chatting
2      ARZ:   but
3→     BUR:   are you chatting someone not face to face?
4      ARD:   hı  yes
              huh
5→     TUG:   do you ha- do you use err social media?
6      ARD:   always i always chatting but err i yani   my friends
                                                 i mean
7      TUG:   yes
8      ARD:   with my friends
9             (2.0)
10     TUG:   not a err stranger one
11     ARD:   yes [i do]nt prefer
```

BUR solicits ARD's opinion on social media (are you chatting someone not face to face?) in a structurally incorrect form. ARD answers her question in line 4, but TUG reformulates BUR's incorrect question in line 5 (do you use err social media?) although there is no clarification request by any group members. ARD contributes more to the conversation after this reformulation. These particular exchanges also exemplify collaborative actions because they help expand the learners' turns.

Request for clarification: This kind of collaborative action is observed when other learners elicit a clarification of what the current speaker has just said in the previous turn. The learners initiate this collaborative move either by repeating some part of the previous turn or employing wh-interrogative morphosyntax. Clarification requests allow speakers to reformulate the previously given information or bring new information to the interaction.

Extract 6.

I Don't Understand (Convergent Task 2- Group 1)

```
((9 lines omitted))
10→    OKN:   you dont like swim
11→    MEV:   yes beca- because i am a blonde blonde hair err and my body
12→           is very err
13     OKN: white [body
14     MEV:        [hassas    sensitive
                    sensitive
15     OKN:   [white man]
16     MER:   [you must] swim in err night maybe[evening or]
17     MEV:                                     [but if if] if i see the s- sea
18     MER:   yeah
19     MEV:   err i-i want to swim at in in the sea [i dont]
20     OKN:                                         [okay]
21→    MER:   oh:: i dont understand what?
22     MEV:   look
23     OKN:   err
24     MEV:   if i s- if i saw if i see
25     MER:   yeap sea [see the sea
26     MEV:            [the sea::   [ye::s
27     MER:                         [ye:s: ((laughs))
28     MEV:   i i want to swim in the sea
29     MER:   yeah me too
30     MEV:   but-
31     OKN:   ((smiles))
32     MEV:   but my body is very err sensitive
33     MER:   you dont obliged to err under the err güneş neydi lan?((laughs))
                                                what was sun mate?
```

Before this particular moment, MEV says that he does not like swimming. OKN requests a clarification (you don't like swim) which is accepted with a confirmation token (yes) in line 11. MEV then expands his turn by presenting more information on the reason of why he does not like swimming. In line 15, although MER provides a candidate response, MEV continues to hold the floor until MER explicitly announces her non-understanding (oh:: i dont understand) and requests a clarification by a wh- interrogative (what?). Starting from line 22, MEV initiates a clarification of his previous turns by taking subsequent turns with MER. The minimal tokens in lines 25, 27, and 29 indicate MER's understanding of MEV's clarification turns. Line 33 is another indicator of the clarification request's resolution, where MER has initiated a new turn constructional unit. Based on these patterns, the clarification requests create moments during which learners can collaboratively work on any comprehension breakdowns, and then they can pursue their conversation.

Comprehension check: The moments when current speakers checks whether the other learners have understood their previous utterances can create collaboration among learners. These particular moments are generally initiated by producing an explicit 'do you understand' comprehension check formulations by the current speaker. When other learners claim their non-understanding upon this request, the current speaker is observed to divide his previous sentence into smaller units and slow their speech.

Extract 7.

They Don't Know How to Use Social Network (Divergent Task 1- Group 1)

```
1→    OKN:  some people use website or social network but they dont know
2→          how to use it i think its terrible ((smile)) i think
3     MEV:  okay
4→    OKN:  do you understand me?
5     MEV:  no
6     OKN:  i said some people
7     MEV:  yes
8     OKN:  use website or social network
9     MEV:  okay
10    OKN:  but they dont know how to use it they dont know how to use
11          social network or website
12    MEV:  okay
13    OKN:  i think it is terrible ((smiles))
14    MEV:  okay
            ((they move to another topic))
```

In this particular instance, OKN explains his opinion on online dating in lines 1 and 2. Although MEV confirms his turns in line 3, OKN uses an explicit comprehension check (do you understand me). Although MEV previously has confirmed OKN's turn, in line 5, he hints that there is a communication problem. This allows OKN to divide this extended turn into smaller units, all of which receive a confirmation token by MEV. These moments are an instance of collaboration because both OKN and MEV jointly resolve the incomprehension, allowing them to initiate a new turn constructional unit on a different topic after line 14.

Summary of the others' turn: The learners are also observed when summarising each other's turns, which helps all group members comprehend what the previous speaker has already produced. This collaborative action is initiated when a member claims difficulty in hearing the speaker. A third member of the group volunteers to summarise the first speaker's previous turns. Consider the following extract in which TUG summarises the turns of ARZ in which she has talked about knowing her boyfriend's passwords.

Extract 8.

Passwords (Divergent Task 1- Group 2)

```
1→    ARZ: [but] he know err my facebook or instagram login and i know
2→         him the login °facebook and instagram login (yani)°
                                                        i mean
3     BUR: i dont hear
4→    TUG: şey his er her girl- her boyfriend
           err
5     ALL: ((laugh))
6     ARZ: $my girl$-
7→    TUG: knows his err passwords [didnt he?
8     ARZ:                         [her passwords
9→    TUG: senin err hers passwords so
           your
10    ARZ: and i know too
11→   TUG: huh
12    ARZ: [his]
13→   TUG: [and] ARZ knows
14    ARZ: password
15→   TUG: her boyfriend's passwords
16    BUR: heh yes
           huh
```

ARZ has told the group that she and her boyfriend know each other's passwords. BUR claims that she does not hear her contribution (i dont hear). Upon this, TUG self-selects himself as the next speaker and summarises ARZ's constructions in lines 4, 7, 9, 11, 13, and 15 by sequentially taking turns with ARZ. These collaborative exchanges between ARZ and TUG allow BUR to understand the beginning of this conversation, which can be understood from BUR's use of a change of state token (***huh***) and a confirmation marker (yes).

Request for explanation: This collaborative action is initiated when a group member seeks an elaboration on the previous speaker's utterance by constructing a wh-interrogative morphosyntax, by asking the question 'why?'. The following extracts represent this collaborative action which results in BUR's extension of her previous utterance.

Extract 9.

What Is the Best Age For Marriage? (Divergent Task 4- Group 1)

```
1    BUR:  i think err:: (0.5) best age for married (0.5) twenty seven
2          (0.9)
3    MER:  wh-
4    MEV:  ((tsch))
                 +surprised face
5→   MER:  why?
6→   BUR:  because usually (0.8) err (0.5) our (0.2) finish the err (0.6)
7          university (0.5) usually (0.4) and we err (0.5) start the (0.2)
8          work and (0.7) maybe one and (0.2) two years err we (0.7) work
9          (0.3)
10   MER:  y[es:]
11→  BUR:   [and] after that (0.6) i think err twenty seven err or(0.8)
12         err (1.8) twenty seven and err thirty five (0.2) err[::]
13   MEV:                                                       [be]tween
14   BUR:  [yeah]
15   MER:  [oh::] my god
16   MEV:  between this [age]
```

Upon explaining her idea about the ideal age for marriage, MER requests an explanation from BUR in line 4 (why?), allowing BUR to elaborate on her ideas in a more extended turn.

Request for information: The groups' members are sometimes observed when eliciting the meaning of an L2 word, seek for more information, or asking for the L2 translation of an utterance. In the case of a lexical item, it is either followed by translation to L1, providing an L2 synonym or explaining with body language. Learners are rarely observed when using L2 to explain the meaning of the word.

Extract 10.

The First Observatory in The World (Convergent Task 2- Group 1)

```
((5 lines omitted))
6→     BER:  err in kirsehir cacabey mosque
7      MEV:  yes
8→     BER:  is the first
9      OKN:  mosque
10     ALL:  ((laugh))
11     MEV:  is the first
12→    BER:  err observatory
13→    MER:  what is mean?
14→    BER:  °gözlemevi°
             observatory
15→    MER:  gözlemevi
             observatory
16→    MEV:  gözlemevi he::
             observatory hu:h
17→    BER:  is the first observatory [in the world]
18     OKN:                           [gözleme house]
                                        wrap
19     MER:  yeah:: [I interes]ted
20     MEV:         [gözlemevi
                    observatory
21     MER:  in astronomy
22     OKN:  gözlem
             observation
23     BER:  yes
24     MEV:  astronomy
25     OKN:  he::
             hu:h
```

Before this particular exchange, the learners have discussed that they can go to Kırşehir, a rural city in Turkey. Starting from line 6, BER informs his partners about an architectural design situated in Kırşehir, which he claims it is the first observatory in the world. MER does not know the word 'observatory', and she explicitly requests more information (what is mean?). In the next turn, BER provides the L1 equivalence of the word in a softer voice. This is repeated by MER and then by MEV with an elongated change of state token in line 16 (***observatory hu:h***). It is observed that the request for information is correctly resolved among learners since BER expands his turn in line 17. Other learners also comment on this turn in the subsequent exchanges.

The following extract is another example of this collaborative action where SEH requests information on the meaning of an unknown word 'abroad' in the second line with a rising intonation. Upon acknowledging this request (***huh***), TUG explains its meaning in English in line 3. The request for information is also correctly resolved because BUR uses a change-of-state token (***huh***), which signifies her understanding of the new word's meaning.

Extract 11.

Abroad (Convergent Task 2- Group 2)

1	TUG:	okay let's write to abroad
2→	SEH:	abroad?
3→	TUG:	hı another country from your own country
		huh
4	BUR:	hı
		huh

This collaborative action was marked as a request for information rather than a clarification request because in the feedback/evaluation turn, the learners did not use a confirmation marker such as 'yes', which is an observed feature of a 'clarification request'. However, both of the collaborative actions may be initiated by echoing the previous word or part of the utterance to solicit other learners' help.

Provision of the L1 translation of the word/utterance: The last language-related collaborative action is frequently observed when the speaker uses a word or a phrase after checking the online dictionary. The speaker is observed when providing the L1 translation or the word's utterance in a softer voice just after finishing the utterance in L2. The speaker initiates this sequence without getting any request for information or clarification from the other learners.

Extract 12.

Fruitful (Divergent Task 4- Group 1)

1	MER:	[i- i think] <u>we::</u> err (0.3) marriage err (0.3) twenty:: (0.3)
2		especially (0.9) twenty or twenty one years because err
3		(0.6)
4	SEH:	twenty
		((confused face))
5→	MER:	err (0.4) (tsch) we err (1.6) we are the (faintful) (1.0)
6		°verimli°
		fertile
7	ALL:	((laughter))
8→	MER:	$most (0.5) (faintful)$ age
9→	SEH:	[he]
		uh
10→	MER:	[and] err if you want to err (esmort) children ((laugh))
11	BUR:	yeah

In this particular context, MER opens the discussion in line 1 and presents her opinions on the best age for marriage. In line 4, SEH's repetition of part of MER's previous utterance (twenty) accompanied by a confused face is not accepted by MER; so, she pursues explaining her opinions in line 5. She uses a word (faintful) which is an incorrect use in this particular context. Following a one-second silence, MER also provides the L1 translation of the word (fertile) in a softer voice without receiving any request for clarification or information from her partners in line 5. MER then uses the same word in a new sentence in line 7 ($most (0.5) (faintful)$ age). MER's provision of the L1 translation results in a mutual understanding with the other members. In the subsequent turn, SEH uses a change of state token to show his understanding, and in line 10, BUR also shows her understanding of MER's turn with a confirmation marker (yeah). The provision of the L1 equivalent of the word helps clarify what the speaker has tried to explain. After this action, the current speaker either continues holding the floor or other members suggest other L2 forms. Consider the following extract during which a provision in L1 creates a collaborative search for a correct word.

Extract 13.

Graduated From (Divergent Task 4- Group 2)

1	ZUL:	older sister married now married err two years ago
2	ARD:	err how old are-
3	ZUL:	she
4	ARD:	she↓ is she
5	ZUL:	that is she err she was twenty four or twenty five
6	ARD:	hı:::↓
7	ZUL:	years old
8	ARD:	normal
9→	ZUL:	normal but err she studied ya da işte okudu
		or (she)studied
10→	SIM:	educated
11→	ARD:	hı yes
12→	ZUL:	she is educated medicine and then
13→	KAN:	graduated from
14→	ZUL:	graduated
15→	SIM:	hı graduated
16→	ZUL:	from twenty five

This extract starts with ZUL's initiation of providing an example along lines 1 and 8, by exchanging turns with ARD. In line 9, ZUL refers to her sister's degree (err she studied), and she provides the L1 translation of this formulation (*or (she)studied*). This provision allows other members to offer alternatives to ZUL's translation. In line 10, SIM provides a new word (educated), and ARD confirms this in the subsequent turn. Following this, ZUL reformulates her previous turn with what SIM has offered in line 10. KAN offers another formulation (graduated from), which both ZUL and SIM accept. Based on this particular exchange, it can be said that the provision of L1 translations create a collaborative moment during which participants co-construct meaning together.

Conclusion and Discussion

This study investigated collaborative actions during L2 task-based face-to-face peer interactions as a group. To date, there is relatively little research on collaborative discourse in the framework of sociocultural theory by adopting an emic perspective to investigate the moments where learners collaborate and co-construct knowledge together. The researchers mainly employed an etic coding of collaborative instances by analysing LREs as a common analysis unit to understand collaboration (Sato & Viveros, 2016). An etic coding scheme such as LREs (Swain & Lapkin, 1998) would miss the particular collaborative actions observed in the current context. For this purpose, a qualitative analysis, particularly a constant comparative method, was employed. There are eight emergent language-related collaborative actions, labelled as 1) provision of the word/phrase, 2) reconstruction of others' turns, 3) request for clarification, 4) comprehension check, 5) summary of the others' turn, 6) request for explanation, 7) request for information, and 8) provision of the L1 translation of the word/utterance.

Similar discourse moves to the ones emerged in this study exist in previous studies. These are discussed for each collaborative action in the following part. However, it is important to discuss some possible explanations for observing these particular collaborative actions in the current data. The first reason for observing these collaborative actions might be related to the language proficiency of the learners. Although all of the participants were from the same proficiency level reported by the language school administration, some of the learners were observed to display more proficient use of L2. The learners might have acted as novices and experts (Donato, 1994; Ohta, 2001) during their interactions, as neither of them shared the same weaknesses and strengths (Fernández Dobao, 2016). The collaborative actions such as '*reconstruction of others' turns*' and '*summary of the others' turns'* might have been observed due to learners' perceived proficiency differences as well. Another reason for observing these actions may be due to the nature of the tasks. Convergent and divergent tasks (Duff, 1986) were used to solicit interactions from each group. Due to the tasks' inherent features, it would not have been possible for the learners to complete the tasks without resolving any communication breakdown or stating their own position in resolving the tasks. As a result, the learners may have employed different strategies to resolve language-related issues, resulting in collaborations. The other reason for observing the collaborative actions might be the topic choice of the tasks. Learners' familiarities with the topics were ensured because previous research suggested that more elaborate discourse is likely to be elicited by familiar topics (Li, Williams, & Volpe, 1995). Moreover, background knowledge such as topic familiarity facilitates performance on tasks (Leeser, 2007), resulting in more interaction opportunities during the group interaction. However, the participants might not have found opportunities to converse on these topics during an interaction before. Therefore, searching and providing new words as in '*provision of the word/utterance*' or assistance seeking/giving collaborative actions such as '*comprehension check*', '*clarification check'*, and '*request for information or explanation*' might have been promoted by the topic choice.

After discussing some possible reasons for the observation of the collaborative action, the next part will discuss each collaborative action individually.

Language-related Collaboration Types

The literature on peer interaction is missing the definition of the term 'collaboration'. It has been defined as *"the process that occurs when learners create opportunities for learning through their deliberation on language, provide each other with the help, which might be either solicited or unsolicited, to keep the flow of the activity emerged from the task"* by referring to the collaborative actions defined in the current context (Aksoy, 2018, p. 8). Language-related collaborative actions emerged to resolve any language issues, such as when learners struggled to find a word or provided corrections to group members' utterances. Two collaborative behaviours of this study can be grouped as representing this feature of language-related collaborations. In the literature, word search sequences have similar collaborative action patterns named '*provision of the word/utterance*' in the current research (Duran, Kurhila, & Sert, 2019). Other studies (Erten & Altay, 2009; Foster & Ohta, 2005; Kos, 2013; Sato & Viveros, 2016) defined a collaborative move initiated when a learner struggles to finish his/her utterance and another person (collaboratively) completes the rest of the sentence. The researchers did not mention learners' resorting to their L1 to initiate the collaborative move in those studies. However, the learners frequently resorted to their L1 as a word search activity in the current study.

Foster and Ohta (2005) and Kos (2013) defined a strategy as a form of assistance, named 'other-correction'. Although there is a similarity between their category and the collaborative action named '*reconstruction of others' turns*', the collaborative action defined in this study involves a much broader context. One member of the learner group reformulates the previous speaker's turn without any solicitation from the group members and corrects the partner's incorrect utterance. In the current context, reconstructions are used to correct the incorrect use of morphology or syntax. Learners also reconstructed their partners' semantically unclear utterances.

Another feature of language-related collaborative actions is that they revolve around resolving any comprehension problems among learners. Four collaborative actions defined in the study can exemplify this feature of collaboration. Firstly, similar collaborative discourse movements were defined in the literature (Beatty & Nunan, 2004; Erten & Altay, 2009; Foster & Ohta, 2005; Gillies, 2006) that might correspond to '*request for clarification*'. However, the collaborative action defined here is a combination of two collaborative discourse strategies; '*explain text/task/ideas*' and '*solicit clarification*'. This collaborative action allows speakers to reformulate the information previously given or bring new information to the current study's interaction.

The category of '*comprehension check*' has some similar features to how Foster and Ohta (2005) defined it as "*any expression designed whether that speaker's previous utterance had been understood by the interlocutor*" (p. 410). Similarly, when the speaker attempts to understand whether the other group members have understood the previous utterance, these moments were defined as collaborative acts.

The collaborative action named '*request for explanation*' is similar to what is defined as an 'assistance seeking strategy' in another study (Kos, 2013). Similarly, the collaborative action in the current study is initiated when an interlocutor seeks a solicited explanation of the speaker's utterance. Therefore, it has similar features as in '*elaborations*' (Gillies, 2006), which help provide solicited explanations and open-ended questions. '*Request for information*' is also addressed by Kos (2013) as another assistance seeking strategy which helps elicit lexis, morphosyntax, or spelling. However, 'request for explanation' is observed when learners initiated an elicitation of an L2 word meaning, extra information, or L2 translation of an utterance. This collaborative action is followed by translation to L1, provision of L2 synonyms, or explanation with body language in a lexical item. The learners rarely use L2 to explain the meaning of the word. Although the beginning of both clarification and information request is initiated by the repetition of a previous word or part of the utterance to solicit help, there is not a confirmation such as 'yes' in the response turn in a *request for information*, differentiating it from a *request for clarification*.

The collaborative action labelled as '*summary of the others' turns*' contributes to the comprehension of the conversations during each task, and there is not a similar category in the literature. During the collaborative moment, one interlocutor volunteers as the next speaker and summarises what has been uttered in the previous turns without any solicitation from the group members. This action is initiated with incorrect formulations or unclear messages. The final language-related collaborative action '*provision of the L1 translation of the word/utterance*' is usually observed when the current speaker uses a word with incorrect pronunciation. The speaker initiates this move without receiving any request for information or clarification from the interlocutors. Immediately after using incorrect pronunciation, the speaker provides the L1 equivalent in a softer voice. The learners are also observed to use this strategy when they are not sure about the use of a particular word. As a result, other learners take turns and provide help with the reformulation of the utterance.

Suggestions and Pedagogical Implications

The collaborative behaviours defined in this study have been marked as collaborative moments where one type of collaborative actions was employed in learner interactions. It could be a better idea to conduct a turn-by-turn analysis to mark the discursive strategies that learners use to initiate such instances and resolve them. This would also help identify how many learners actively participated in collaborative moments. Non-verbal interactions such as gestures or body language can also be included in the analysis. It was clear in the recordings that the learners used and oriented to non-verbal communication for mutuality. A follow-up interview can also support the findings as they have the potential to have an in-depth analysis into collaborative moments.

This study did not aim to focus on learning or teaching any specific language items due to using collaborative behaviours. It is not yet known whether the learners learned any L2 items. However, the findings can still support the benefit of using peer interactions in L2 classrooms. Firstly, the peer interaction activities provide a context for practising language use (Philp et al., 2014). As the learners try to explain their opinions by forming L2 sentences, this will increase their L2 fluency and accuracy over time. Although there was no presence of an authority figure, i.e., a teacher during the interactions, the learners successfully managed to complete the tasks assigned in L2. The learners sometimes resorted to their shared L1, which can be stated as one reason teachers' reluctance to use peer interactions activities in the classrooms. The literature suggest that L1 use can be used as a mediational tool to organise thoughts, and it is also beneficial for L2 learning from a sociocultural perspective (van Compernolle, 2015). Moreover, the peer interaction activities provide more opportunities for symmetrical interactions since participants will be language learners (Philp, 2016). They will therefore experience greater levels of comfort (Sato & Ballinger, 2016).

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Appendices

Appendix A. Examples for divergent and convergent tasks from the study

Divergent Task 1	What do you think about online dating? - Have you ever met someone from online websites? - Do you think it is a good idea to meet someone from online websites? - Do you think you may fall in love with someone that you have never met in person? - Are there any disadvantages? What may be disadvantages? - Will you continue your relationship? Will you marry in the end?
Convergent Task 1	Drawing a dream café? - You and your friends are bored of the café you frequently go. Here is the chance to design and furnish your dream café with decisions on the layout, types of services, furniture. What do you want to put in your café? You need to make a unanimous decision with your friends.

Appendix B. Transcription symbols used in the extracts (Jefferson, 2004)

Symbol	Use
(0.2)	A number inside brackets denotes a timed pause. A number in parentheses indicates the time, in seconds, of a pause in speech.
[text]	Indicates the start and end points of overlapping speech.
(text)	Speech which is unclear or in doubt in the transcript.
(( ))	Annotation of non-verbal activity.
::::	Colons appear to represent elongated speech, a stretched sound
-	Indicates an abrupt halt or interruption in utterance.
° °	Indicates whisper or reduced volume speech.
? or ↑	Indicates rising pitch.
. or ↓	Indicates falling pitch.
$word$	Dollar sign indicates that the speaker utters the word with a smile
ALL CAPS	Indicates shouted or increased volume speech.

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Turkish and Turkish Language and Literature Teachers' Views' on the Reading Skills and Turkey's Performance in PISA: A Focus Group Interview

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Abstract:

This study aims to examine Turkish and Turkish language and literature teachers' views on reading skills and Turkey's performance in PISA. A focus group interview, one of the qualitative research methods, was used in this study. Teachers' views on reading skills in PISA, the general situation in Turkey's PISA, the concept of the text, questions of measuring high-level skills and solutions were investigated by qualitative data analysis methods. The study group of the research consisted of teachers determined using criterion sampling technique, one of the purposeful sampling methods. The steps of the focus group interview were used in collecting the data, and content analysis techniques were used in the analysis. As a result of the research, teachers' opinions on reading skills in PISA; with incomplete information and low success themes; text concept; with texts in books and themes of changing text concept; questions measuring high-level skills; with ready-made questions and systematic questions themes; solutions are explained under the theme of continuous training.

Keywords: PISA, reading skills, focus group interview, Turkish teacher, Turkish language and literature teacher.

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Introduction

The International Student Assessment Program is a study by the Organization for Economic Cooperation and Development (OECD) that evaluates the knowledge and skills of 15-year-old students who continue their formal education, provided that they have received at least seven years of education in three-year terms. The main purpose of PISA is to measure to what extent students have the knowledge and skills necessary to participate in the information society and obtain outputs about education systems. In PISA, data on mathematical literacy, science literacy and reading skills proficiency levels as well as learning desires, learning strategies and school environments of the students are collected (OECD, 2016).

OECD publishes the data obtained from PISA comparatively in its reports. Exam results are used to compare the knowledge and skill levels of students in their countries with the knowledge and skill levels of students in other countries participating in PISA, to set standards to increase the education level and determine the strengths and weaknesses of education systems (Ministry of National Education, 2013). Countries see their status at the international level with the results of PISA and take these indicators into account in curriculum development, teacher training and effective education policies.

PISA began to practice in 2000 and joined Turkey in 2003. PISA was conducted with the participation of more than half a million students in 79 countries, including 43 in 2000, 41 in 2003, 57 in 2006, 74 in 2009, 67 in 2012, 76 in 2015 and 37 in OECD in 2018 (OECD, 2019a).

In each PISA, one of the fields of mathematics, reading and science is determined as a weighted area. Reading in 2000 and 2009, mathematics in 2003 and 2012, and science literacy in 2006 and 2015 were predominantly evaluated. In 2018, the main area was again reading skills (OECD, 2019a).

Reading Skills in PISA

Reading skill in PISA is the whole of the competencies that will enable the reader to establish a close relationship with the information in one or more texts given for a specific purpose, beyond expressing the text aloud (OECD, 2019b). In other words, the student should understand, use, evaluate, associate and reflect on the texts presented in various ways to improve his knowledge and potential and participate in society; it focuses on the students' ability to use information in real situations. The concept of literacy describes the "realization of reading effectively for a specific purpose and task" (OECD, 2010). In PISA, texts are handled in four groups as continuous, discontinuous (independent), mixed and multiple (OECD, 2009). In this grouping, the way information is presented in the text is decisive. The texts that contain narrative, explanation, description or discussion structure are continuous; the texts that present information in the form of lists, forms, and graphics are considered discontinuous. The mixed presentation of continuous and discontinuous texts (e.g., scientific writing containing graphics and tables) or the presentation of these forms together (such as a catalog) constitutes mixed and multiple text forms.

In addition to different text formats, different tasks are expected in the reading process in PISA. Students are expected to demonstrate the ability to find specific information, to form a general understanding of the text, to interpret the text, to reflect on the content and format of the texts, and to defend their own point of view (MEB, 2010). In addition, texts are also classified in terms of editing purposes in PISA, such as writing a personal letter or a biography for "private" use, announcements for "public" use, a manual or report for "professional" use and a textbook for "educational" use (OECD, 2009). On the other hand, the importance of reading skills has increased with the effects of technology. Nowadays, not only written sources but also electronic sources are used. Digital search engines provide millions of answers to individuals, and understanding the accuracy of these answers gives individuals the responsibility to be more literate. Literacy requires using different sources and being able to distinguish between reality and perception. As the areas of use expanded from printed materials to computer screens and smartphones, the structure and format of the texts also changed, and reading became a practical need. Processes, such as analyzing, combining and interpreting information from multiple sources, have become daily processes of reading. The methods used to evaluate reading skills in PISA have been updated to adapt to these changes in the quality of reading.

The changes in the reading skills assessment framework in PISA 2009 and 2018 applications can be summarized as follows (OECD, 2019b): More emphasis has been placed on multi-source texts in which multiple texts created by different authors are presented together. Such texts are becoming more common in the digital world day by day. The computer-based application of PISA reading skills made it possible to present these texts to students. The use of multi-source texts increased the difficulty of these questions. It has also helped expand the scope of advanced reading processes and strategies aimed to be measured within the scope of PISA research. Reading fluency, which is defined as "the ability of students to read texts easily and effectively", was also evaluated in the PISA 2018 application. In the computer-based assessment, an individualized test design was used, which made the questions be answered differently according to the answers given by the student to the previous questions. Computer-based evaluation, which allows efficient use of individualized tests and multi-source texts, was used.

PISA 2000, 2003, 2006 and 2009 paper-pencil tests were carried out in the form of PISA 2015 and 2018 PISA applications were computer-based (OECD, 2019b). The selection process of the school and students to participate in PISA is determined by the OECD by stratified random sampling method (OECD, 2019a). Turkey participated in the PISA 2018 applications with 186 schools and 6890 students representing 12 regions.

Turkey's calculated average scores on the PISA 2018 also increased compared to 2015 in all three areas. However, differences in achievement between schools continue to exist to a great extent. When the distribution by regions in the field of reading skills is examined, the students with the lowest performance are those in the Southeast Anatolia (430.8), Northeast Anatolia (423.6) and Mideast Anatolia (409.4) regions.

In PISA 2018, Turkey was determined to be the most successful group of students of the Science High School students. Social sciences high schools and science high schools showed performance above the OECD average of Turkey. Anatolian High School students performed higher than Anatolian Imam Hatip High School and Vocational and Technical Anatolian High School students (OECD, 2019a).

These success differences between regions and school types show that students' reading comprehension skills are not at the desired level. Studies on reading (Anılan, 2004; Baydık, 2011; Cayci & Demir, 2006; Cetinkaya, Ates & Yildirim, 2016; Dickens & Meisinger, 2016; Dogan, Ates, Cermik & Yildirim, 2018; Epcacan, 2009; Jabamani, 2016; Kim, 2015; Temizkan & Sallabas, 2011; Topuzkanamıs & Maltepe, 2010; Veenendaal, Groen & Verhoeven, 2016; Yildiz & Cetinkaya, 2017) showed that understanding what you read is a skill that should be emphasized. Measuring high-level reading comprehension skills in PISA requires a detailed examination of the field of reading skills.

The literature on reading skills in PISA reveals the need to study the subject with different dimensions. When current studies are evaluated, Fındık and Kavak (2013) reported socio-economically disadvantaged students in PISA 2009 reading literacy achievement in Turkey; Bozkurt (2016) stated that PISA 2003 has dealt with Turkey's reading access to 2009; Oren, Konuk, Sefer and Sarıtas (2017) compared the text with type text types in Turkish teaching programs in PISA. In the international literature, Dıpf et al. (2020) examined the short answer questions in PISA; Lau and Ho (2016) evaluated the PISA 2009 reading skills results of students in Hong Kong; Meng et al. (2017) analyzed PISA 2009 reading skills of students in China and America, Naumann and Sälzer (2017) addressed the digital reading competence of students in Germany in PISA 2012; Torppa et al. (2018) examined PISA 2012 reading skills of students in Finland; Tsvetkova (2016) evaluated PISA 2012 reading skills of students in Bulgaria; Xiao and Hu (2019) analyzed the educational practices of the top five countries that were successful in reading skills in PISA 2015. It is important to consider reading skills in PISA together with Turkish and Turkish Language and Literature teachers.

With this study, the opinions of teachers, who are the implementers of the curriculum, about PISA exams and solutions for the development of reading skills will be revealed. Because it is teachers who try to improve students' thinking skills with the texts they choose and the questions they prepare. This means that teachers should meet their students with questions that measure high-level skills.

The evaluation of teachers, better quality text at the development in private to improve the PISA success, primarily specifying Turkey's thoughts about what needs to be done in students' higher-order thinking skills, will provide the meeting with questions and lessons. Thus, the quality of the education will increase and high-level cognitive skills will be improved by constantly encountering these questions, and our students will not fall behind other countries in the PISA exam. The aim of this research in this context is Turkish and Turkish Language Literature teachers in Turkey to investigate their views on questions regarding levels and types of texts used in questions in the reading area with performance reading skills in PISA and put forward proposals for solutions. For this purpose, the research question, "What are the Turkish and Turkish-Language Literature teachers of reading in PISA and opinions on Turkey's performance?" was asked.

Method

Research Design

This study is an analytical research model. McMillan (2004) states that analytical research is a research method in which documents, records and other environments are analyzed concerning events, thoughts, concepts and works and that context is important in the process of interpreting data. In this study, the ability of reading in PISA performance and Turkey's Turkish and Turkish Language and Literature was studied through focus group discussions with teachers in the analytical research model.

Participants

In this study, participants were Turkish and Turkish Language-Literature teachers who were obliged to gain reading skills and high-level thinking skills in the city center of Konya in the 2019-2020 academic year. As the size of the group to be included in the focus group interview was limited to a minimum of five and a maximum of 12 people in similar groups, as stated in the relevant literature, the group size was determined as eight in the study (Bas, Camir, & Ozmaldar, 2008; Debus, 1999; Yildidirim & Simsek, 2013).

The participants of this study were determined using the criterion sampling technique, one of the purposeful sampling methods (four males, four females). In criterion sampling, firstly, criteria were determined and individuals who meet these criteria were included in the sampling (Creswell, 2016; Schumacher & McMillan, 2006). The following criteria were determined for criterion sampling:

• According to the PISA 2018 sample distribution in Turkey (43.7% of the students of Anatolian High School, the Vocational and Technical High School 31,1% and 13,7% Anadolu Imam Hatip High School, High School of Science 4.4% 2.4% Social Sciences High School, 4.0% Multi-Program Anatolian High School, 0.6% Anatolian Fine Arts High School and 0.3% secondary school), Turkish Language and Literature teacher in different secondary education institutions or Turkish at secondary school to be working as a teacher,

• Teachers had varying professional seniority and equal numbers of male and female teachers, as this could be effective on the phenomenon of reading skills in PISA.

It was stated that the teachers would not be able to make any explanation about the subject in advance, as a focus group interview would be held, and that a subject related to their field would be discussed. Teachers participated on a voluntary basis. The demographic information of the participants is shown in Table 1.

Table 1.

Demographic Information of Participants

Teacher	Gender	Seniority	School type	Branch
A	F	10 years	Science High School	Turkish language and literature
B	M	7 years	Anatolian Imam Hatip High School	Turkish language and literature
C	F	4 years	Vocational and Technical Anatolian High School	Turkish language and literature
D	M	18 years	Anatolian High School	Turkish language and literature
E	M	1 year	Social Science High School	Turkish language and literature
F	M	13 years	Middle School	Turkish
G	F	22 years	Multi-Program Anatolian High School	Turkish language and literature
H	M	15 years	Anatolian Fine Arts High School	Turkish language and literature

Four of the teachers were women and four were men, and their professional seniority varied between 1-22 years. One of the teachers was working in secondary school and the other in different types of high school. The branch of the teacher working in secondary school was Turkish, and the branch of the other teachers was Turkish Language and Literature.

Researcher Roles

In qualitative research, the researcher's role is very important because the researcher can direct the process and reflect on his own experiences. For this reason, the researcher is responsible for explaining its role and demographic characteristics in the process (Creswell, 2016; Yin, 2011). In this study, the researcher was working as an associate professor of Turkish education in a university, and the focus group interview was conducted under the researcher's moderation. Holloway and Wheeler (2013) point out that the involvement of the researcher in the research process is important in reaching the most valid information about the research process. In this study, the researcher did not interfere with the participants and supported the participants to interact with each other. The discussion was encouraged by asking questions by the researcher. It was tried to involve each participant in the discussions, include the opinions of everyone in the group and ensure a balance between the participants.

Data Collection: Educational Focus Group Interview Process

Focus group interview is a special discussion-based group interview technique (Bas, Camır and Ozmaldar, 2008; Kruger & Casey, 2000; Millward, 1995; Ersoy, 2017;

Yildirim & Simsek, 2013); it is the acquisition of in-depth knowledge and thought generation through a carefully planned discussion and an unstructured interview by using the effect of group dynamics in an environment where individuals can freely express their ideas (Merriam, 2013).

While preparing the focus group interview questions, firstly, the researcher made a review of the literature on PISA and draft interview questions were prepared. These interview questions were presented in the opinion of two field experts working on PISA. Interview questions were restructured in line with the recommendations of the experts. For example, "What are your views on high-level skills?" The question was, "What do you think about the development of higher-order thinking skills and the questions measuring higher-level skills?" It was arranged.

Before starting the interviews, the participants were informed that they would act in accordance with the confidentiality principle at the end of the interviews and that the focus group meeting would be recorded with a camera and their permission was obtained. The focus group meeting was held in December of the 2019-2020 academic year. As stated in the literature, the duration of the interview in focus group interviews was at least one hour and a maximum of two hours (Debus, 1999; Yildirim & Simsek, 2013). The data were then written down by the researcher by examining the camera records. Information about PISA results, PISA question examples, high-level skills and questions measuring these skills were used in this study.

In the focus group interview, the questions developed by the researcher based on the literature were directed to Turkish and Turkish Language and Literature teachers. During the interviews, open-ended questions that required comments were asked (Bas, Camır & Ozmaldar, 2008). Interview questions consisted of open-ended questions to guide explanation and detailed conversation. It was decided to ask the following questions to serve the purpose of this research:

1. How do you assess the situation in Turkey's PISA?
2. What do you think about reading skills and levels in PISA? (e.g., When is it done? Who is attending, which age group).
3. How do you find when you compare the texts in the books with the texts in PISA? Do you think it is enough? If you compare it with the texts you use in your lessons, how would you evaluate it?
4. What do you think about the development of higher-order thinking skills and the questions measuring higher-level skills? Why is that? Can you prepare questions that measure high-level skills? Can you explain the process?
5. What do you think should be done to increase Turkey's PISA success?
6. What kind of in-service training and courses do you think teachers need to be successful in PISA and develop students' higher-order thinking skills?

In this study, a focus group consisting of eight teachers and a researcher who worked in middle and high schools and voluntarily participated in the focus group interview was formed. The questions were directed to the participants by the researcher.

In the focus group interview, the application process recommended by Krueger (1998) was carried out:

1. The researcher explained that a focus group interview would be held on PISA, stated the purpose of this research and the focus group interview process.
2. Brief introduction of each participant.
3. Introduction questions: One or two examples of questions.
4. Collecting everyone's opinion with the first question, getting additional opinions after everyone has expressed their opinion.
5. Transition questions: Discussion of one or two questions.
6. Research questions: Asking the main questions of the focus group.
7. Final question: Asking participants if they want to add.

In the focus group interview, teachers were asked questions about PISA, information was given in the absence of information, and questions were asked again. The questions were asked for all the participants, and each participant who wanted to express his/her opinion was given the right to speak. New and different ideas may arise as the participants benefit from each other's thoughts in focus group meetings (Cokluk, Yilmaz & Oguz, 2011). Those who wanted to express their opinions based on the opinion of another person were given the opportunity again.

In the questions in the focus group interview form, the opinions of each teacher regarding the question were tried to be taken. Guidance was provided for the discussion of concepts or topics, and the importance of the participants' expressing their own opinions, not general opinions, was emphasized in the discussions. It was especially stated that no opinion would be judged so that teachers could express their opinions comfortably. In cases where the teachers wanted to express their opinions, their opinions were taken; thus, it has been tried to address different aspects of the subject.

Data Analysis

Within the scope of this research, the data obtained from the focus group interview were evaluated using content analysis. In content analysis, it is aimed to reach the concepts that can explain the collected data. In this respect, the process of content analysis is to encode similar data, categorize them in the light of certain themes, and interpret them in a way that the reader can understand (Glesne, 2013; Yildirim & Simsek, 2013). In this study, the following four stages were followed while analyzing the data; first, the data were encoded, the sub-themes and themes were reached by categorizing the encoded data according to their common features, then the sub-themes and themes were arranged and the findings were defined and interpreted.

After analyzing the data of the researcher, two more field experts performed content analysis by comparing their analysis independently. According to Suler (1995), when analyzing focus group interviews, the results should not be quantified and should not be given by percentage, frequency, statistical tests or tables. What matters in reporting the focus group interview is not the numbers but what the teachers say (Creswell, 2016). In this direction, the teachers' opinions coded in the focus group interview were analyzed and presented in the form of sentences directly used by the teachers after being themed.

Validity and Reliability

Merriam (2013) states that the basic criterion for internal validity (credibility) is that researchers feel that the data have reached satisfaction with sufficient participation and that field experts evaluate the logical appropriateness of the raw data. In this study, credibility was achieved by ensuring adequate participation in the data collection process and by presenting the created theme-sub-themes to the opinion of two field experts.

Patton (2014) points out that the extent to which the research results are transferable is determinant in ensuring external validity (transferability) in qualitative research and that rich descriptions are required to ensure this. In this study, the opinions of the participants were described by making one-to-one quotations from their opinions.

Merriam (2013) states that the consistency of data should be checked for reliability in qualitative research. In this study, the consistency in determining the participants, collecting data, conceptualizing themes and sub-themes was defined in detail. Miles and Huberman's (2014) inter-coder reliability analysis formula was also used. As a result of the reliability analysis formula, the reliability coefficient between coders was determined as 0.78. In the reliability of the interview, in order for another group to achieve similar results with the same activity, participant group characteristics were given, roles were specified and information was given about data collection and analysis (Yildirim & Simsek, 2013).

Results

As a result of the findings obtained from the focus group interview with the teachers, two main themes were reached in the general situation section about PISA. These themes were called incomplete information and low success. While the subthemes of the incomplete information theme emerged as indifference/neglect, ignorance and social media effect, the subthemes of the low success theme emerged as the subthemes of examining and accepting successful countries/learned helplessness.

Text concept: The texts in the books and the changing text concept were explained with themes. The theme of the texts in the books consisted of continuous texts and lack of information subthemes. The changing text concept theme consisted of complex structure, uniform text idea/not recognizing discontinuous texts and different text subthemes.

Ready questions theme: Book/activity questions consisted of subthemes of finding low level and timelessness. Systematic questions theme consisted of subthemes of different levels, abstract explanations, token tables and answer keys.

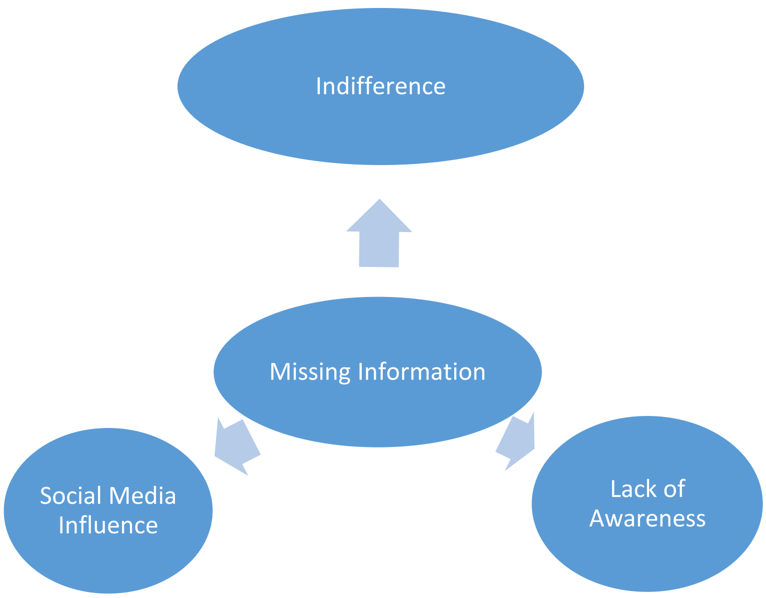
Continuing education theme; workload reduction consisted of research literacy and motivation subthemes. The themes reached in this study and the sub-themes collected under the themes are explained below, respectively.

Findings Regarding the General Situation in Turkey PISA

Teachers Turkey's general condition specified in the missing information is presented in Figure 1 and their low success PISA theme is indicated in Figure 2.

Figure 1.

Missing Information Theme and Sub-Themes



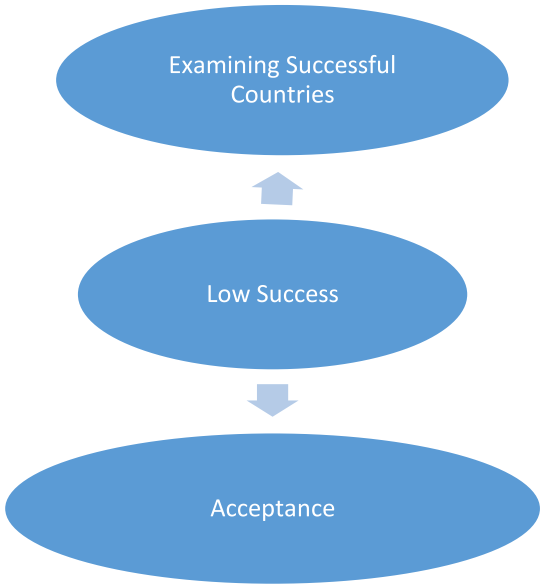
The teachers expressed their opinions representing the subthemes of indifference/neglect, lack of awareness and social media influence under the theme of incomplete information. The teachers stated that they did not have complete information about PISA. This finding suggests that the awareness of teachers about PISA is low. Those who had little information about PISA also stated that they encountered this information on social media. A teacher said, "as far as I follow on social media, it is done every year, but I don't know how our students answer questions in English" (F) expressed. Teachers' opinions were examined when they were seen against the situation in Turkey were very interested in PISA. Teachers regarding the general situation in Turkey's PISA "I know we have failed. However, I do not know exactly to what extent our situation is.” (B); "As far as I know, there are questions for reading comprehension." (D); "The questions must be translated into each country's language, but I'm not sure." (G) Their views show that they have some knowledge but do not have full command of the subject. The teachers added that they were more aware of the lack of knowledge in an international exam, such as PISA.

Teachers stated that reading skills were measured in different ways and that there were teachers in their schools who sometimes gave speeches about PISA. They emphasized that these teachers did not think they know exactly the reading skill in PISA.

Some of the teachers had to obtain the results in reading skills in Turkey's PISA exam because she did not know the PISA results were shown in comparison with other countries.

Figure 2.

Low Success Theme and Its Sub-Themes



The teachers defined the subthemes of the low achievement theme as the study and acceptance of successful countries/learned helplessness. Teachers should examine the education systems of countries that have been successful in PISA: "I think we should examine the education systems of the Far East countries. Especially for China. "(D); “I think, we should follow the countries that are successful at these top levels. What are they doing, where are we lacking, we need to understand them. "(E) expressed with their opinions. “This has been a very detailed measurement. For this reason, I think he puts the situation clearly. We must learn lessons." (A); “But first, let's accept the situation. This is the situation of our students." (H); “Yes, unfortunately, this is sad. Thus, we are also not right with something." (C); “We have very crowded classes. Maybe that's why. We run out of time and energy for high-level skills." (G); as stated views indicate that accept the situation in Turkey.

The two teachers said, "It is sad to see that we are well below average in all exams." (B); "There is almost always a hundred point difference between us and the first country. This is too much." (F) have expressed their opinion reveals that they have to follow before PISA scores of teachers in Turkey.

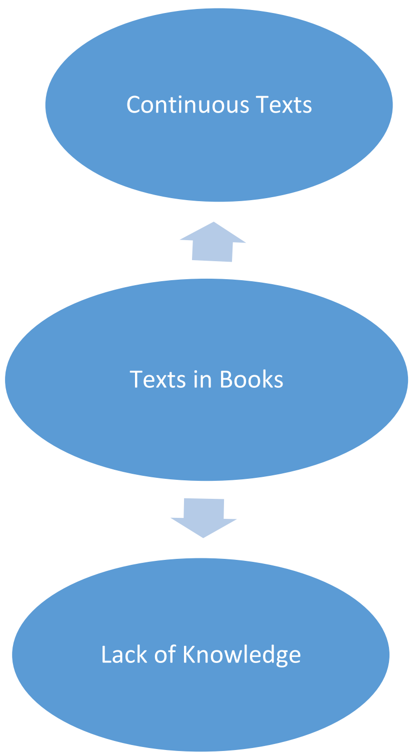
Information was provided for the participants who stated that they did not have information about the sample group. The teachers found the determination of the sample in PISA complicated, as they had not studied it before. Teachers' unfamiliarity with the sampling stages was also effective here. As an example of this, teachers said, "it is very thought-provoking that we are at the bottom of countries. Could there be a problem with the sample? "(C); "I know that the proportioning is done when determining the sample in all countries. Thus, there are students from different schools and classes here. (A)

Findings Regarding the Concept of Text

The teachers explained the text concept with the texts in the books and the changing text concept themes. In Figure 3, the theme of the texts in the books is continuous texts and in Figure 4, the subthemes of lack of information are presented.

Figure 3.

Text Theme and Subthemes of Texts in Books



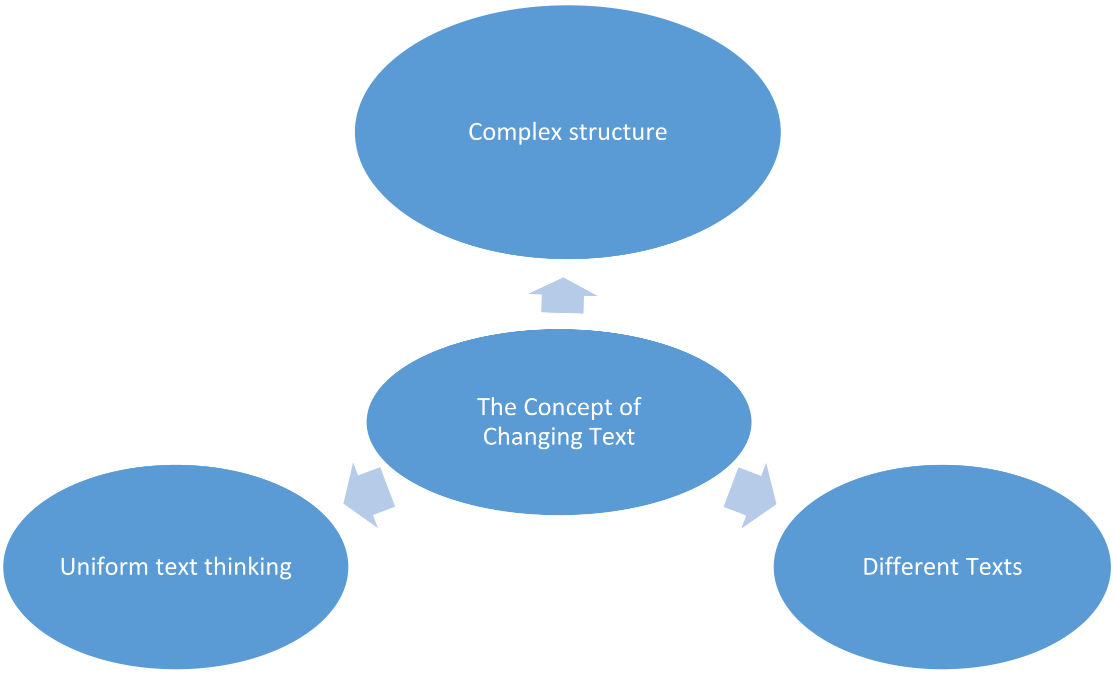
"I use the texts in the books." (G); "I use additional texts in lessons, but I have never seen PISA texts." (D); "We are processing sections from the works of important figures of Turkish and world literature that we all know." (F) There are also teachers. However, it is seen that the teachers generally only use the texts in the textbooks, and the texts in the textbooks are continuous texts, so discontinuous texts are not used in the lessons.

Teachers' "I haven't researched the texts in PISA before." (H); "Unfortunately, I have not studied the texts in PISA either. I don't think it's too different." (C) Expressions suggest that there is a lack of knowledge about the concept of text in PISA. Teachers did not use the text types and contents that students read in PISA in their lessons.

For the teachers who stated that they had not seen the texts in PISA before and had no knowledge, information was given about the text concept in PISA.

Figure 4.

The Theme of the Changing Text Concept and Its Sub-Themes



The changing text concept theme consisted of complex structure, uniform text idea/not recognizing discontinuous texts and different text subthemes. "If these are texts, too, it means that the text we know is very different and expanding." (F); "They felt very different to me, but of course, they can be used. When I said text, I only understood what was made up of texts. Because we know that. We should get used to that too." There are opinions expressed in (C) form. These views show that teachers see that the text concept has changed because the texts in PISA include discontinuous texts as well as the continuous texts they are familiar with.

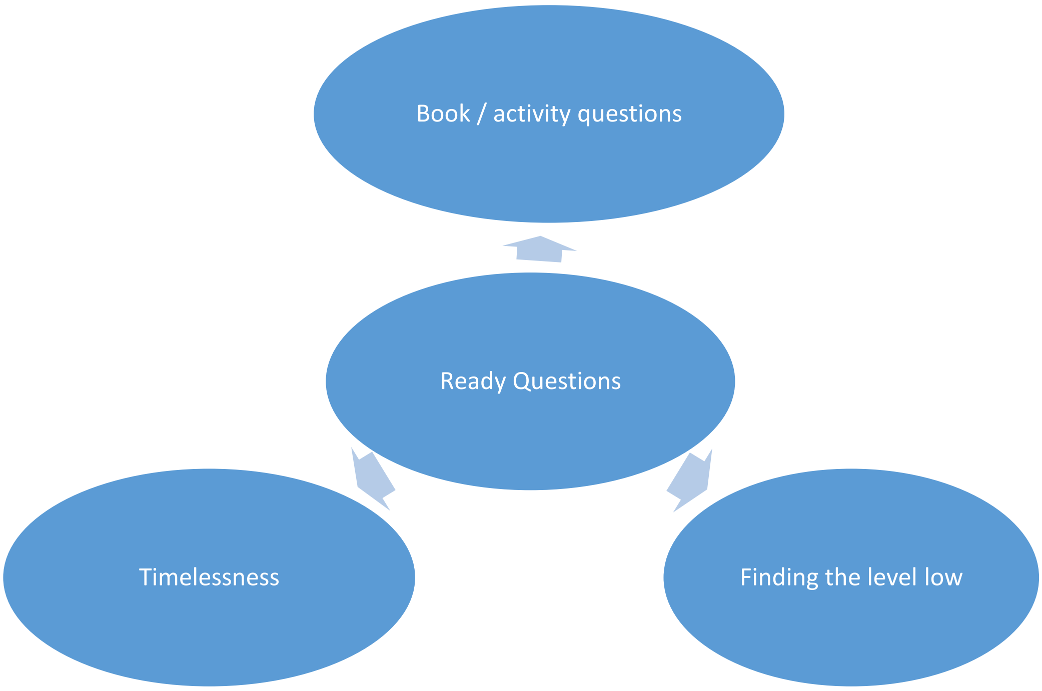
To some teachers, discontinuous texts have been complicated. These teachers expressed their views; “they dealt with the structure, we call text from different angles and in detail. Actually, I think this should happen, but it also feels complicated. "(A); “It takes a lot of time to understand. It was a little difficult for me to understand. (B) form. Some of the teachers stated that they heard the concept of discontinuous text for the first time. They stated that they had difficulty understanding the concept of discontinuous text because they used texts throughout their professional lives.

Findings Regarding the Questions Measuring High-Level Skills

The teachers explained the high-level skills with the themes of ready questions shown in Figure 5 and systematic questions are shown in Figure 6. Ready questions theme, book/activity questions consist of subthemes of finding low level and timelessness.

Figure 5.

Ready Questions Theme and Sub-Themes



The teachers stated that they mainly used the questions in the textbooks. They attributed this mostly to the timelessness caused by the abundance of workloads. For example, “of course we have to develop high-order thinking skills. This is for sure. But in this timelessness, it is very difficult for us to focus on these skills” (G) shaped views are available.

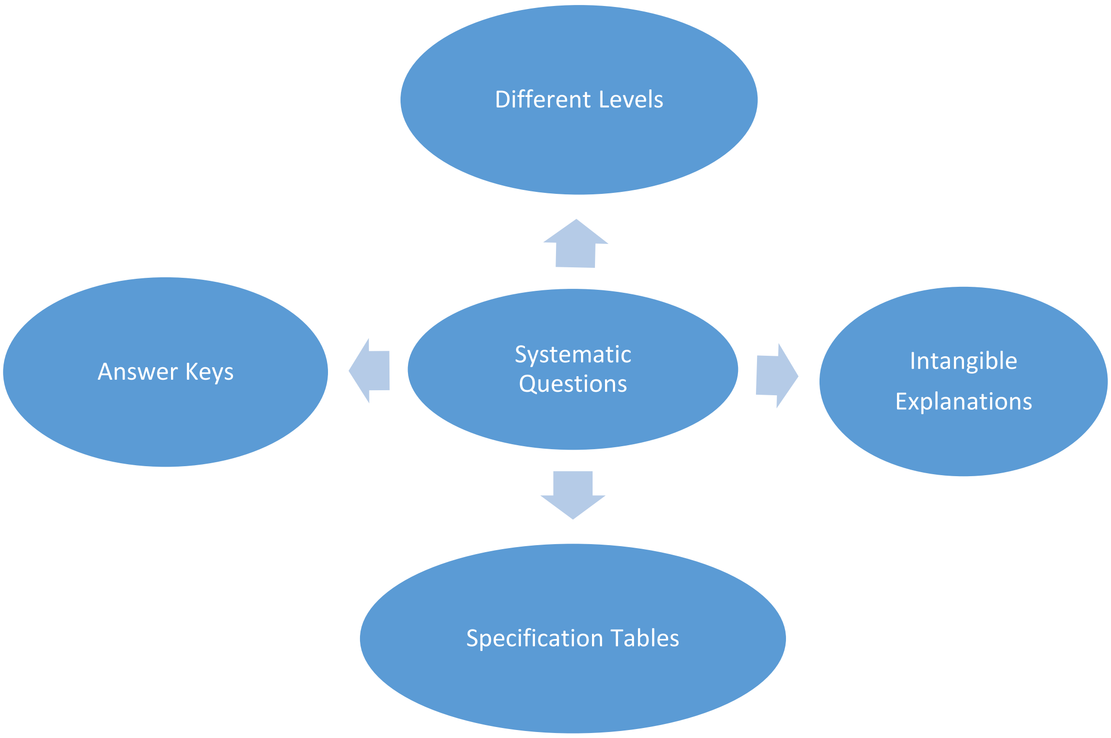
Some of the teachers stated that they find their students' levels low and argue that the questions in the books are sufficient. A teacher said, “For high-level thinking skills, students should also be ready for this. Unfortunately, it would be pointless to ask high-level questions to students when there is a problem, even at the basic level." The (A) view can be given as an example.

Also, some teachers think that the questions in the books measure high-level skills as well. Pretty good questions. It includes the upper level, I think. "(D) This view suggests that this teacher thinks he does not need additional questions.

Information was provided for the teachers who said that they had not seen the questions before:

Figure 6.

Systematic Questions Theme and Sub-Themes



The teachers used the theme of systematic questions; they explained subthemes of different levels, abstract explanations, token tables and answer keys.

The teachers found the explanations for the evaluation phase of the questions in PISA satisfactory in terms of being quite detailed. One teacher said, "The ratings are very detailed. I think this is very important. All possibilities have been considered." The expression (A) can be given as an example. The teachers stated that they especially liked the inclusion of all the answers that could be given in the partial answers section of the answer key. However, some of the teachers stated that the explanations indicating the levels did not find sufficient levels. There should be more concrete explanations. "(H)

Some of them will take time to prepare questions considering the levels." It should be quite time-consuming to prepare questions for each level." (E) defended his opinion.

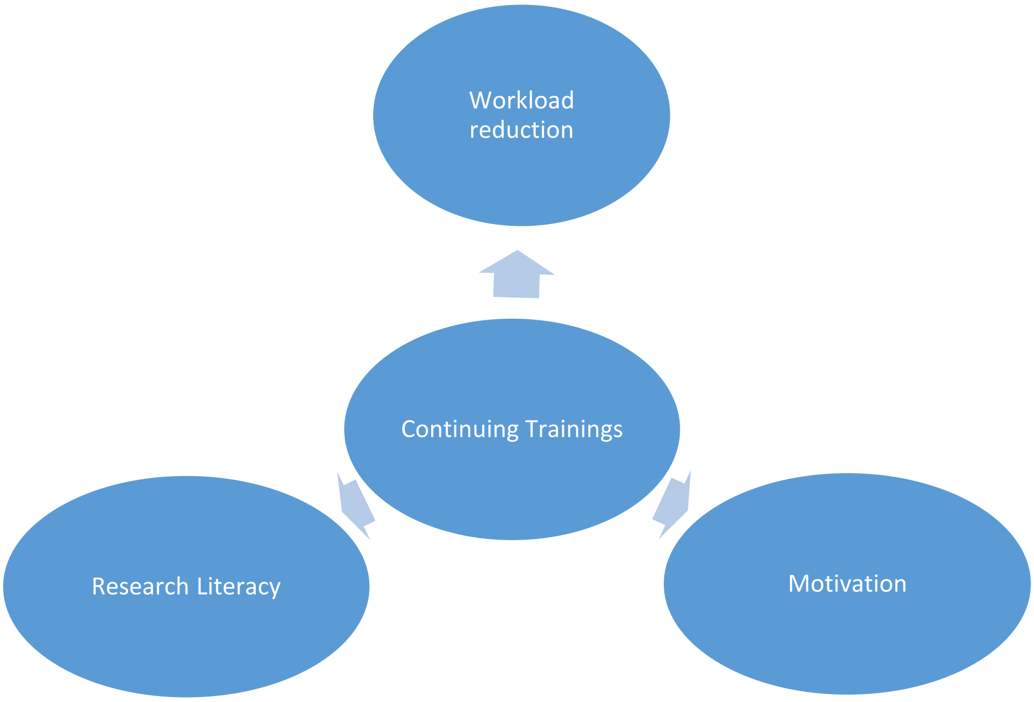
Teachers stated that the most difficult part in preparing questions that measure high-level skills was to prepare questions suitable for the levels. Since the teachers did not have a command of these levels, they described the process of preparing questions starting from the selection of appropriate texts to the characteristics of the level as quite laborious. One teacher said, "It feels like it can be difficult to find texts and create questions for all these levels." (G) This opinion can be presented as an example.

Findings Regarding Solutions

The teachers interpreted their opinions on the solutions with the theme of continuing education expressed in Figure 7. Sub-dimensions of the theme, workload reduction was research literacy and motivation.

Figure 7.

Continuing Education Theme and Sub-Themes



The teachers stated that they should improve themselves by taking training and reflect this to the classroom environment. Teachers' opinions: "First, we should get training on text types, levels and question preparation in PISA so that we can develop students. If we are equipped, we can provide them with high-level skills. For this, we should choose texts suitable for real life, especially in text selection. Thus, the student will understand that he can use the information in daily life." (TO); "I think we need to put technology into play, too. For this, training should be given. Practical training on how to ask questions. Let's not forget that it is not crowded but in small groups. Absolutely repetitive training." (G) The fact that they expressed their views shows that they want continuous training. In addition, the teachers wanted the training to be not only about PISA but also about assessment and technology use. “We definitely need a lot for success in PISA. The priority is not to have any lack of information. But it's not just information about PISA. It is also necessary to be well equipped for measurement and evaluation. "(B); "We should prepare our questions with detailed answer keys as in PISA. We must also determine their level and know what we are measuring. For this, I think we need to improve in assessment and evaluation."(A) opinions revealed that they were aware of their shortcomings in assessment and evaluation.

They stated that they would use the text and question types in PISA in their lessons. A teacher; “But here we cannot charge all teachers. We have a lot of lessons. Our workload is too much. "(C) expressed his opinion. However, other teachers stated that they would use especially discontinuous texts in PISA in their lessons.

In addition, since high-level thinking skills were measured in PISA, teachers thought that they could create appropriate learning environments for them to acquire these skills by motivating their students first.

Discussion, Conclusion and Suggestions

In this research, the views of Turkish and Turkish Language-Literature teachers about reading skills in PISA, the general situation in Turkey's PISA, text, concepts and solutions were investigated by qualitative data analysis methods under the headings.

This study was concluded on Turkish and Turkish Language-Literature teachers who had a lack of knowledge about reading skills in PISA They thought the text concept in PISA was different from the text concept in textbooks and similar to the text concept, the questions in PISA were different from the questions they used in lessons and exams. In addition, teachers stated that they needed continuous training to overcome these differences.

Turkish and Turkish Language and Literature teachers' views on the PISA reading skills in Turkey and incomplete information have disclosed two themes, including low achievers. While the subthemes of the missing information theme were interpreted as indifference/neglect, unawareness and social media effect, the sub-themes of the low success theme were interpreted as the subthemes of examining and accepting successful countries/learned helplessness. From these data, it was concluded that teachers do not have the required level of knowledge about PISA and they thought that the education systems of successful countries should be examined to increase their scores in PISA. Bozkurt (2016) examined PISA 2003 Turkey's reading access to the desired level in 2009 and developed the skills of reading and reading turned into an effective tool that could not have attracted attention. Yildiz, Unal, Bayrakcı and Polat (2019) also drew attention to the need to develop Turkish students concerning high-level reading comprehension skills measured in PISA. In this respect, it is obvious that teachers should have the necessary knowledge about PISA in developing reading skills.

The texts in the books and the changing text concept are explained with themes. The theme of the texts in the books consists of continuous texts and lack of information subthemes. The changing text concept theme consists of complex structure, uniform text idea/not recognizing discontinuous texts and different text subthemes. These data showed that teachers were far from the concept of text in PISA. Yagmur (2009) stated that the basic principles of current reading approaches are not included in the reading activities in Turkish textbooks. In addition, the acquisitions in the Turkish course curriculum require high-level thinking processes; however, he argues that many of these gains are handled inadequately in textbooks, and he emphasized that texts and practices aimed to create value judgments rather than intellectual processes may cause students to make moral inferences rather than cognitive inferences. When the primary education Turkish Lesson Reading Skills Achievements are compared with the PISA reading qualifications, it is seen that the Turkish lesson acquisitions mostly address the lower level qualifications in PISA, and PISA does not have the acquisitions that can directly coincide with the qualifications at the 5th and 6th level (Batur & Ulutas, 2013). Bozkurt, Uzun and Lee (2015) compared the cognitive levels of end-of-text questions of Korean and Turkish textbooks with the results of PISA 2009; they determined that the Turkish textbook questions are predominantly at a basic level. Researchers have put forward the notion that one of the reasons behind the low scores to get in this situation PISA assessment framework, mostly in the higher-order thinking the presence of the questions that target the skills and student reading events where there are familiar in Turkey. In this context, continuous-discontinuous text bringing exhibitors together with students in Turkey and in the course of the types of questions that measure higher-level skills and the importance of taking part in the book is obvious.

Ready questions theme, book/activity questions consist of subthemes of finding low level and timelessness. Systematic questions theme consists of subthemes of different levels, abstract explanations, token tables and answer keys. Continuing education theme consists of workload reduction, research literacy and motivation subthemes. From these data, it was concluded that as in the text concept, teachers did not use the question types in PISA in their lessons and exams. Teachers stated that they should receive continuous training to learn the types of questions and texts in PISA in detail and to contribute to the higher-level thinking skills of their students. In the study of Dos and Atalmıs (2016), the annual expenditure per student and the teacher salary positively correlated with all PISA scores, the number of students per class and the number of students per teacher showed a negative relationship with these scores, and among the investment variables, the common predictor of PISA mathematics, reading and science scores It was determined that the variable was the teacher's salary. In studies on the teaching profession, the concept of wage has often been emphasized and it has been stated that salaries affect teachers' quality and motivation (Celikten, Sanal & Yeni, 2005; Figlio, 1997). Teachers' salaries in our country have fallen behind European countries (Tunckasık, 2007). Our country's falling behind in PISA exams can be associated with this information. In other words, an individual's performance and job well-being are significantly affected by economic gains (Erdem, 2010; Sungu, 2012; Saglam & Saglam, 2005). Sanders (1999) revealed in his study that spending per student and average teacher salaries have an effect on success. Therefore, it can be argued that teachers' thinking that they do not get rewarded despite having too much workload may prevent them from having research literacy skills and sufficient motivation.

In the PISA 2018, it was determined that 49% of the change in the reading skills scores of the countries was explained by the expenditures for education. There is a positive relationship between the education expenditures of countries and their reading performance (OECD, 2019b). Turkey, the expenditure on education is below the OECD average. In studies, especially class size has a significant effect on low achieving students, primary school students and low socio-economic level students (OECD, 2014). It is emphasized that small classes are more effective for these groups (Akarhielm, 1995). In particular, it is stated that a reason for reading failure is the class size (Hattie, 2006; Hoxby, 2000). In this context, when the opinions of the teachers in this study are evaluated, it can be stated that it will be easier to acquire high-level skills in PISA reading skills.

PISA results show that Turkish students are far behind the countries participating in PISA in the field of reading skills. Therefore, it is seen that Turkish students are behind in high-level skills, such as analyzing, questioning and being able to look critically. Halpern (2003) states that critical thinking and questioning, which is a complex thinking process that includes different skills and attitudes, enable people to analyze unexpressed assumptions, question the reliability of a source of information, and follow the best way to solve a problem. In this context, it is obvious that our students have these skills. Kim et al. (2008) state that high-level questions in PISA require opposing the views in the text, extracting information that is not directly included in the text, and evaluating new information in the text. In high-level questions, the fact that the rate of Turkish students is much lower than the average of participating countries expresses the Turkish students' own opinions on the text; it has difficulty in justifying an argument by rationalizing it and associating the text with its own knowledge. This situation provides clues that Turkish students do not fail in bringing together-interpreting information but rather in open-ended questions (Bozkurt, 2016). As stated by the teachers, an important place should be devoted to activities and questions aimed to develop high-level skills in the lessons.

The results of the study suggest that teachers have a lack of knowledge, especially about the text concept and questions in PISA. In this respect, Turkish and Turkish Language and Literature teachers who will bring together texts and questions of different structures and levels that students will use, especially in developing their high-level skills, should be eliminated. For this, the workload of teachers should be reduced, and the texts and questions in the textbooks should be diversified according to different structures and levels as in PISA.

Conducting a focus group interview in this study means that teachers hear each other's views in accordance with the structure of the focus group interview. Therefore, teachers may tend to express generally accepted opinions instead of their own. In this respect, it can be suggested that different studies should be conducted with more participants using quantitative or mixed research approaches.

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Turkish education, reading comprehension, high-level thinking skills, speaking skills

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Use of Technology in Social Studies Teaching: The Journey of Five Teachers*

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Abstract: This study aims to examine the effect of personal experiences of Social Studies teachers on using technology in the teaching process. The study was carried out with narrative research that is one of the qualitative research models. A purposeful sampling method was used in determining the study group. Five Social Studies teachers were included in the study. The research data were collected with a semi-structured interview form. Three sessions of interviews were conducted to collect research data. In the data analysis, narrative analysis was used to form the participants' stories, and thematic analysis was used to present the findings from the participant stories systematically. The findings revealed that Social Studies teachers have limited technological opportunities in their learning process; they could not access sufficient equipment during their undergraduate education. Still, despite these limited opportunities, they can develop their technology use skills in line with their interests and curiosities after starting their professional life. Besides, Social Studies teachers with more years of professional experience are willing to realise and eliminate their shortcomings, and cooperate. Thus they use instructional technologies effectively.

Keywords: Social Studies teacher, narrative research, instructional technology

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Introduction

The increasing digitalisation of societies has triggered today's technology-based transformation of education, many components from educational environments to teaching processes have been included in the technological circle, in more detail; it has been observed that one of the effects is on the planning, execution, and evaluation of the teaching process (Instefjord & Munthe, 2017; Bolick, 2017; Hew & Brush, 2007). This situation has caused changes in teacher roles and teaching practices. Thus, it became clear that the teacher should assume the role of a manager and provide a function that includes technology in educational environments (International Society for Technology in Education [ISTE], 2017; Wright & Wilson, 2009). In this regard, the Organisation for Economic Development and Cooperation stated that due to the change of school and teacher roles, there is an expectation from teachers to use information and communication technologies for teaching purposes effectively (Organisation for Economic Co-operation and Development [OECD], 2009). Additionally, it has been stated by the National Council for the Social Studies ([NCSS], 2013) that it is inevitable to include technology in teaching processes to adapt to the digital age and to connect with students in courses. There has also been an expectation for teachers to use information and communication technologies competently to plan the teaching process, develop digital materials, effective teaching, and evaluating teaching to support student development (Ozgur, 2020). These expectations are an important indicator of understanding of education in the 21st century, gradually moving away from traditional methods and evolving into a different understanding using digital technologies. However, since teachers have important obstacles in including information and communication technology in their courses and competencies, this new understanding requires a long process.

The obstacles inherent in the new understanding of education are classified as first-order and second-order barriers in the literature (Ertmer, 1999; Tosuntas et al., 2019; Cheng et al., 2020; Francom, 2020). First-order barriers are external barriers. These barriers consist of the inadequacy of school resources, time limitations, lack of training on how to use technology, lack of technical support, and the inability of the school administration to provide administrative support at the desired level. Second-order barriers are internal and include teachers' beliefs about technology use in the classroom, teaching and learning processes, and willingness to change. However, in the study conducted by Tsai and Chai (2012), it was stated that there was another third-order barrier. The researchers stated that teachers should have design thinking skills in designing a technology-based teaching process for students' individual differences. They also stated that an effective technology integration might not occur even if the first two barriers are overcome in a lack of design thinking skills. Another classification was carried out by Hew and Brush (2007), and this study categorised the barriers related to technology integration under six basic themes. These are; resources (inadequacy in technology, access to technology, time, and technical support), knowledge and skills (lack of technological and pedagogical knowledge and skills), institution (leadership, deficiencies in school timetable, and institution planning), attitudes and beliefs (technology integration of teachers low attitudes and beliefs about usage), evaluation (evaluation processes and exams have great importance), and subject culture (general practices and expectations inherent in the structure of the institution).

All of these difficulties provide important clues for integrating technology into the teaching process. Obstacles can be removed by following these clues. Besides, the appropriate structure of the course to which technology integration will be provided will make the process even easier. Social Studies course has an important advantage at this point. The Social Studies course is a suitable course to benefit from digital technologies frequently (Shriner et al., 2010; Demirezen & Keles, 2020). Because Social Studies courses have an interdisciplinary structure. Due to this structure, Social Studies facilitates bringing content related to many disciplines to the classroom environment. Additionally, there are many concrete and abstract concepts belonging to different disciplines in the content of the Social Studies course. Instructional technologies are effective in learning these concepts by students (Dere & Ates, 2020). Due to the suitable structure of the Social Studies course, many digital technologies and technological devices, from various software to digital cameras, can be employed in the teaching process to achieve the determined teaching goals (Debele & Plevyak, 2012). Besides, Curry and Cherner (2016) stated the necessity of including technology in Social Studies teaching as a necessity of the modern age. Although the Social Studies course is suitable for integrating instructional technologies, it should not be ignored that the basic dynamic here is the belief and competence of the Social Studies teacher to achieve this.

It is also quite complex to evaluate the teachers' integration of technology into Social Studies as in all branches. Although many models have been presented in the literature to achieve this, one of the universally accepted and most up-to-date models is the "Technological Pedagogical Content Knowledge (TPACK)" model designed by Mishra and Koehler (2006). The researchers stated that it is not enough for teachers to have knowledge of technology alone. At the same time, they emphasised that it is important to realise the technology-supported teaching process with an appropriate pedagogical understanding and specific field knowledge. However, Wilson (2003) stated that instructional technology courses are separate courses in many teacher-training programs. Still, these courses do not develop the connection of technology, field knowledge, and pedagogy. As a result, in the evaluations with the TPACK model, the inadequacies of the teacher candidates and teachers emerge. It takes a long process to develop teachers' instructional technology and technology integration competencies. Teachers should comprehend how to include the new elements of the developing technology in their courses in the most appropriate way (Kaya & Yazıcı, 2019). Shin et al. (2019) stated that it is necessary to gain extensive experience in technology integration and use them in Social Studies teaching methods courses. However, these experiences are not enough alone. Additionally, teachers' pedagogical beliefs about technology use and integration should be brought to a sufficient level (Tondeur et al., 2016). In this regard, Yılmaz and Ayaydın (2015) stated that the physical facilities of education faculties should be improved, and the lack of equipped lecturers in teaching technology should be eliminated to gain skills related to teaching technology.

When the literature is examined, there are many studies conducted with different research methods examining the perspectives of Social Studies teachers and teacher candidates on instructional technology and technology integration. For example, Ersoy and Bozkurt (2015) aimed to reveal the primary school teacher’s experience using the smart board through narrative research. As a result, they identified that the teacher could improve his technology use skills in line with his interest and that there are problems with the internet and electricity infrastructure while using smart boards. Yılmaz and Ayaydın (2015) used a semi-structured interview form to examine Social Studies teachers’ competence and their perceptions of efficacy in using instructional technologies. The researchers concluded that the instructional technologies course that the participants enrolled in undergraduate education was not efficient and that more than half of the participants see themselves as sufficient in using instructional technology. Furthermore, Dere and Ates (2020) examined the observations and experiences of teachers regarding the use of technological tools and materials in Social Studies courses in their case study research. As a result of the research, it was concluded that Social Studies teachers closely follow the emerging technologies; the most used tool in their courses is the smart-board and they have positive opinions about using technology. Demirezen and Keles (2020) examined the techno pedagogical content knowledge competencies of Social Studies teachers regarding various variables using the Technological Pedagogical Content Knowledge (TBAP) Scale. As a result of the research, it was concluded that Social Studies teachers consider themselves competent in using technology and that the variables of gender, seniority, and access to technology do not affect their TPACK competencies. Tondeur et al. (2016) examined the relationship between teachers’ pedagogical beliefs and their use of technology in education with a qualitative research approach. As a result of the research, it was concluded that there is a significant relationship between pedagogical beliefs and the use of technology in education and that the use of technology in education led teachers to a constructivist approach. In their research, Farjon et al. (2019) examined the attitudes and beliefs of preservice teachers in including technology at the beginning of their undergraduate education. They concluded that attitudes and beliefs have a strong effect on technology integration, while access to technology has a weaker effect. Finally, Shin et al. (2019) examined the perceptions and views of Social Studies teacher candidates and a faculty member about a technology-supported course. As a result of the research, it was concluded that most of the preservice teachers found a course supported with technology useful, and the faculty member used technology in their courses to fill the gap between theory and practice. However, despite all these studies, no study has been found that examines the use of instructional technology in the courses of Social Studies teachers with a narrative research pattern depending on their personal experiences. This situation points to an important shortcoming. Social Studies course is in a structure where instructional technologies are used frequently. For this reason, it is necessary to examine Social Studies teachers’ instructional technology competence thoroughly. Based on this deficiency, the purpose of this research is to examine the effects of Social Studies teachers’ personal experiences on the use of technology in the teaching process. For this purpose, answers were sought for the following sub-problems.

1. Which life experiences emerged in Social Studies teachers' early period of life (before formal education) in their relationship with technology?
2. How did the experiences of Social Studies teachers in the formal education process (primary, secondary, and high school) affect their technology use skills?
3. How did the experiences of Social Studies teachers in the undergraduate education process affect their understanding of including technology in the teaching process?
4. How did Social Studies teachers' professional experiences reflect on their use of instructional technology?

Method

Research Model

This research examines the effect of Social Studies teachers' personal experiences on using technology in the teaching process. Therefore, the study was designed as narrative research. Narrative research is a research model that aims to reveal individuals' experiences through stories, depending on the constructivist perspective (Stephens & Breheny, 2013). Narrative research has an understanding that allows events to be shared with different individuals through a determined communication channel (Ersoy & Bozkurt, 2016). Narrative research, which has an interpretative structure, reveals important sections within the stories told by individuals and interprets their effects (Pinnegar & Daynes, 2006). In this regard, Bruner (1996) also emphasised that personal stories are an effective tool in revealing experiences. However, these experiences are not independent of the socio-cultural sphere of influence. For this reason, the stories of the participants should not be evaluated independently from the socio-cultural structure they are in (Johnson & Golombek, 2002). Therefore, narrative research should be carried out in a specific process. In relation to that, Creswell (2012, p.514) suggests a process that consists of defining the problem, determining the participants who will make sense of the phenomenon with purposeful sampling, collecting personal stories, retelling individual stories, cooperating with the participant in the whole process of the research, creating holistic stories, and making a confirmation process. In this research, the research process was continued by adhering to the procedure stated. Since the narrative research enables the presentation of individual experiences and the interaction with the environment chronologically, it has been determined as the research pattern to reveal how Social Studies teachers make sense of instructional technology implementations. The narrative research pattern aimed to reveal the interaction of individuals with the environment and the effects of this interaction on individuals. Thus, the process that starts in early childhood and covers professional life has been evaluated in the context of interaction with the environment.

Study Group

There are five Social Studies teachers in the study group of the research. The purposeful sampling method, which is frequently used in qualitative research, was used to determine the research group (Patton, 2014). In accordance with the purpose of the research, following criteria were sought for the participants to continue their professional life actively, to be a graduate of the faculty of education, to complete their undergraduate education in Social Studies teaching, to be interested in instructional technologies, to spend intensive time with digital tools and to voluntarily share their experiences. Four of the participants included in the study work in a private educational institution, while one participant continues his professional life in the Ministry of National Education. Participants were reached through teachers who the researchers knew. For this, the researchers first met with Social Studies teachers in their immediate surroundings. Then, with the teachers' advice, candidates were determined, and the participants who were thought to meet the criteria were contacted. Finally, five Social Studies teachers who met all criteria were included in the study. The experiences of the participants were presented under different names to keep the information of the participants confidential. Introductory information of the participants was presented below.

Aslihan: Aslihan has been teaching Social Studies for two years. She was born in Ankara in 1994. Aslihan started her primary education and completed her higher education here. She is continuing her graduate education, which she started in 2017. Aslihan defines herself as someone who likes to learn and share. Her areas of interest include watching biography-themed movies and reading history and psychology books. In addition, she describes herself as interested in instructional technology. She defines her family as tolerant of technology.

Hakan: Hakan has been teaching Social Studies for three years. He was born in 1994 in a small district of Kutahya and started his education here. He continues his graduate education. Hakan describes himself as "a teacher who cares about literacy and tries to instill this in his students". Having a habit of reading books from an early age, Hakan writes about history and philosophy on several websites. He expresses that his hobbies are cultural tourism, reading books, and gardening. He defines himself as someone who attaches importance to technological tools and instructional technologies. Hakan describes his family as a family that attaches importance to education and has a tolerant approach to technology.

Beyza: Beyza has been teaching Social Studies at a private institution for three years. She was born in Ankara in 1995. She completed her education in Ankara from primary education to higher education. Then she started graduate education in this city and still continues. Beyza states that her most important hobby is reading book, and she loves sharing book reviews with her friends. She also has a blog account on social media where she comments on the books she reads. She states that she is pleased to include instructional technologies in her courses. She describes her family as tolerant of technology.

Ibrahim: Ibrahim has been working as a Social Studies teacher at a private institution for eight years. Ibrahim was born in the province of Tekirdag in 1989. He completed his undergraduate education in a city which is located in the Aegean Region. İbrahim states that he likes to explore different cultures, to present his cultural knowledge to his students with the help of digital tools, and especially to read about the History of the Republic. Additionally, he likes to follow educational technologists and websites that contain content about instructional technology on social media. Ibrahim's family has tolerant manner, and have a supportive approach towards technology.

Umut: Umut has been working as a Social Studies teacher in the Ministry of National Education for 12 years. He was born in 1985 in a village far from the city centre of Gumushane. He completed his higher education in a city in the Eastern Anatolia region. Umut states that his most important hobbies are reading about the Ottoman Empire and dealing with different sports branches. He also stated that he has an intense interest in instructional technology and has received certificates in this field. Umut's family has a traditional structure and has a tolerant manner towards the use of technology.

Data Collection Tool and Collecting Data

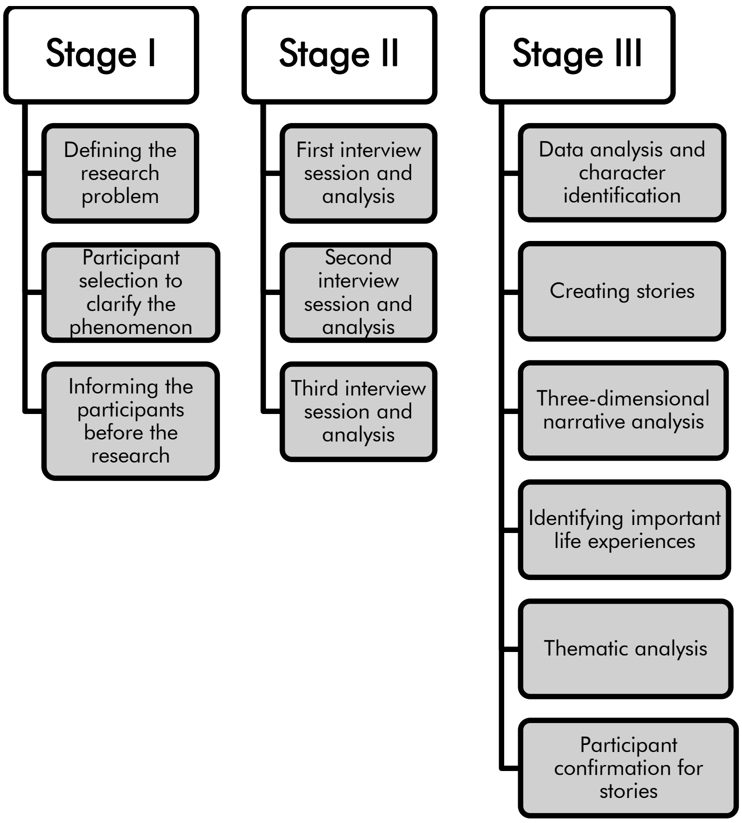
Research data were obtained from five Social Studies teachers within the scope of three-session interviews. The main reason for the interviews to be held in three sessions is that the experiences of a long period can only be revealed with specified number of interviews. In the research, a semi-structured interview form was used as the data collection tool. Thus, avoiding a set of precisely defined questions, an interview process that provides flexibility in the process was preferred. While preparing the interview form, the related research in the literature was examined, and candidate questions were formed. The designed 37 candidate questions was examined by two Social Studies education experts, a language expert and an assessment and evaluation expert. As a result of the feedback, it was stated that some of the questions were overlapping and some of them would not serve the purpose of the research. In this context, arrangements were made in the interview form, and the remaining 25 questions were included in the research process. During the data collection process, three sessions of the interview were conducted with each participant. There was a minimum of one week between the interview sessions. During this period, preliminary analyses regarding the interviews were carried out. Also, free weeks were used to act following the occupational intensity of the participants. In successive sessions, the questions that were overlooked or not asked in the previous session were noted and addressed to the participants in the next session. The interviews were conducted with the help of online video conferencing tools due to the preference of the participants, the Covid-19 Pandemic and their location in different provinces. The date and time of the interview were arranged according to the participants' wishes, and the sessions lasted 20 to 45 minutes. The interview process was recorded with a tape recorder and researchers' notes.

Analysis of Research Data

Before starting the analysis of the data, the audio recordings of each session were transcribed. The written data were analysed weekly, and deficiencies or points not mentioned were noted and addressed to the participants in the next session. Two researchers took part in the data analysis. First of all, independent examinations and coding were carried out. Subsequently, the researchers came together and made comparisons regarding the coding and reached harmony in all codes. After obtaining the data, detailed investigations and character definitions were made. Then, the three-dimensional analysis framework proposed by Clandinin and Connelly (2000) was used in the arrangement and narrative of the interview data. This method is an analysis framework accepted in the literature developed by Clandinin and Connelly (2000), who systematised John Dewey's theory of experience to explain the experience. The dimensions of this frame have been named "social interaction", "time", and "space". Next, the participants' stories were created by examining the research data in the light of the specified dimensions. Then, thematic analysis was used to present the data systematically. The thematic analysis process was carried out following the five-stage process suggested by Robson (2015). First of all, data were obtained, the first codes were created, themes were clarified, thematic relationships were established, combined, and interpreted.

Figure 1.

Research Process



As a result of this process, the themes “Meeting with Technology in Early Childhood Period”, “Educational Experiences, Opportunities and Development”, and “The Process of Being a Social Studies Teacher, Professional Life, and Instructional Technology” emerged. After the analysis of the stories was completed, participant confirmation was obtained from the Social Studies teachers who participated in the study. The stages of the research process are shown in Figure 1.

Credibility, Verifiability, and Transferability in Research

First, expert opinions were taken on the data collection tool to ensure credibility, verifiability, and transferability. Apart from this, the collected data was confirmed by the participants to ensure objectivity and the findings were supported by detailed direct quotations. Additionally, precautions were taken such as using a qualitative research design for the study, choosing a proper data collection tool for the research design, determining the appropriate study group for the study, specifying the characteristics of the study group in detail, and describing the data collection and analysis process in detail. In the research, the process of preventing data loss by using a voice recorder, meticulous examination and presentation of the findings, and ensuring consistency by being analysed by a different researcher was followed. By taking all these precautions, it is aimed to make the research qualified in terms of credibility, verifiability and transferability.

Findings

Meeting with Technology in Early Childhood Period

Social Studies teachers first met with technology in early childhood period. Regarding this period, the participants expressed their interest in technology, the technological opportunities provided by their families, their parents’ use of technological devices, and their perspective towards technology during the formation period of their identities. When the viewpoint of teachers towards technology from the early childhood period are examined, it is seen that all of them have a positive perspective. Especially individual curiosity and family approach are seen as factors that reveal this. It is thought that individual curiosity is one of the important criteria affecting the experiences of teaching technologies after starting teaching.

Aslihan especially states that her interest in technology is at a very high level. One of the reasons for this situation may be that Aslihan has sufficient technological facilities.

> … Afterwards, I was spending a lot of time on the computer like children of that age. I had an above-average interest in technology. Aslihan

On the other hand, Ibrahim stated that he fosters an intense sense of curiosity towards technology and constantly evaluates how he can benefit from technological tools. This sense of wonder can be associated with Ibrahim’s character traits.

> Technological devices and developments have attracted our attention in our period as well as in every child. At this point, there were times when we were constantly turning to these, as it drew our attention to what was in it, what kind of gain it would provide, and what kind of entertainment methods we could find with its use. Ibrahim

Other participants Umut, Hakan, and Beyza, also stated that they were interested in technology, but they did not fully explain the reasons for this. This situation indicates that other participants have a general interest in technology, unlike Aslihan and Ibrahim.

> My interest in technology has increased considerably with television. I was also interested in technological devices in our home. I also liked fixing them. Umut

> My interest in technology was very good in my childhood because my family was also interested in technological developments compared to other families. Hakan

> Back then, there were not many computers in homes. It was developing when I was just getting started to fifth and sixth grade. The computer seemed like a very strange thing to us. Naturally, it only attracted our attention for the game. Beyza

Social Studies teachers stated that the technological facilities they had in early childhood also affected their experiences. While Aslihan and Hakan stated that their families provided them with sufficient opportunities, Umut, Ibrahim, and Beyza stated that they had limited access to technology.

Hakan and Aslihan are lucky individuals to have technological opportunities. With the support of their families, they could easily access the current technologies of their time. Thus, they met technology at an early age and increased their awareness.

> One of the greatest technologies for childhood was the phone. The internet was not as common as it is today. When I started the third grade in primary school, we had a desktop computer in our house. My family also contributes, of course. According to our environment, I can say that our technological facilities were above average. Hakan

> In our era, I was introduced to technology - if we mean computer and cell phone - in the eighth grade. At that time, we had a push-button phone. I also had a computer during high school. Aslihan

There is a disadvantage for Ibrahim, Umut, and Beyza. While the disadvantage for Ibrahim is that his family cannot provide opportunities, for Beyza, it is related to the environment they are in. Participants' limited technological capabilities may have affected their technological competence in the future. If these individuals had Hakan and Aslihan's opportunities, they could exhibit a different development feature.

> Since I could not access technological devices in my childhood, I had a limited chance to use them. I did not have much access to computers, cell phones, or other technological devices. For this reason, my relationship with technology was very limited in childhood. Ibrahim

> Frankly, there were not many computers in the houses around us. I started using them when I was going to middle school. At that time, we didn't know about phones or anything. Beyza

The participant who has the most limited opportunity in terms of technology is Umut. Umut was born and raised in a rural area, could only spend time watching television due to the characteristics of both the physical environment he lived in and his period.

> Electricity had just arrived in the village when I was born. Technology started to develop in my childhood. I did not see much about technology until my primary school period. Ours was the only TV. It broadcasted only one channel. Since we had limited technological opportunity, we were playing games outside. Umut

Social Studies teachers stated that their families' use of technological devices in the early childhood period is also important. They evaluated this in terms of being a role model. However, they stated that their families do not have the same perspective despite their interest in technology. For example, only Hakan stated that his family uses technological devices frequently. On the other hand, Ibrahim, Umut, Aslihan, and Beyza stated that their families do not regularly use technological devices.

Hakan is in a different situation about the technology usage preferences of the parents among the participants. His family is interested in technology and eager to use it. This feature is thought to have a significant impact on the continuity of Hakan's interest in technology.

> My family's interest in technology was top-end for a family living in the countryside. Of course, my family used technological devices. Hakan

For other participants, their parents' use of technology is minimal. Their parents either do not use the technology or use it to a limited extent to meet their basic needs. This parental structure may have affected the participants' role modelling behaviours to remain at a limited level. The inability of the participants to benefit from parental knowledge created a gap in the technology perspective.

> My parents were inadequate in this regard. Technology in Turkey at that time was not very common. Besides, our parents did not have much interest in technology. We learned more from what we saw from ourselves and from our environment, not from our family. Umut

> My mom and dad did not use technology. I have a sister one year younger than me. She did not use it as much as I did. I was using it more active than her. Aslihan

> My family did not use many technological devices. Even now, they only have phones. At that time, they did not prefer to use the internet and the computer. Beyza

> There was only limited use for purpose in my family. They only preferred the phone for communication. Ibrahim

Another emphasis in early childhood is on the parents' approach to the participants' use of technology. Here, a tolerant family approach emerged for all participants. Ibrahim, Umut, Aslihan, Beyza, and Hakan emphasised that their families support the use of technology and at the same time feel the need to control the technology usage process. Therefore, they stated that their parents sometimes warned about the duration and purpose of use.

Despite all these similarities, there are also minor differences in family approaches. For example, although Ibrahim and Umut's families were tolerant, they also continued to warn their children. This situation can be considered as an indication that the parents also adopt a controller role.

> … We were being exposed to some warnings. We were constantly trying to spend time with technological devices with the curiosity of childhood. We were doing this to learn and discover something new. However, as I said, our family was in a moderate but also a little stimulating manner in this regard. Ibrahim

> Even though we had limited access to technology, we used to watch television. Our family wouldn't say anything to it. But when we spent too much time on television, my family would be tensed up, and they would warn us. Umut

Aslihan states that her family has a positive manner on use of technology. However, her family displays a stricter manner towards the duration of use than Umut and Ibrahim's families.

> I was using technology freely. My family supported this; they were positive. … When I spent too much time with technology, my mother and father got angry. Aslihan

On the other hand, Beyza emphasised that her family displayed different approaches towards computer and internet usage. She stated that her family evaluated internet usage differently, also emphasised the controlling characteristics of her family.

> The computer alone did not worry much to my family, but when the internet gets involved, mothers start to be a little nervous. They asked me questions such as "which websites do you access" and "what are you doing on the computer". They were not extremely harsh, but they were still careful. Beyza

Hakan's family intervened in the use of technology in cases where their children exceeded their daily use, despite all their tolerant approaches. This situation is because Hakan does not limit the daily usage time and uses technology intensively.

> Conditions at that time were not as they are today. I was constantly playing games on the computer. The computer was in my room, and I could sometimes overdo it. That's why my parents were putting limitations. Hakan

Educational Experiences, Opportunities, and Development

When the stories of Social Studies teachers were examined, it was understood that the technological opportunities they had in their schools during their primary, secondary, and high school education were different from each other. Teachers predominantly stated that they have very limited opportunities at the primary school level and that limited technological opportunities started to develop during the secondary and high school education process.

Living in the village has an important effect on the experiences of Ibrahim and Hakan in the formal education process. Both teachers stated that the technological equipment in the primary school in the village was limited. However, they stated that this situation started to change in secondary school. This situation can be interpreted as educational opportunities in rural settlements create a disadvantage in individuals' experiences regarding technology.

> I started school in the village primary school. There was not even a TV in our classes. Eventually, I tried to take a small TV that we had at home to school. Since I attended secondary school in the district, it was quite advanced compared to the village primary school. There was a TV in every classroom. Apart from that, we also had computers we used in computer courses. Hakan

> I can say that technology was used very limitedly in primary school. As a technology, I can talk about overhead projector at that time. It was also rarely used. Opportunities were limited, as I completed primary school in the village school. In the middle school period, we used it more widely, especially in Social Studies courses. We had computer courses. We were trying to learn something with a limited number of computers. When we started high school, we used technology more actively. This time, we started to have more courses in the computer lab. We used slide shows in our history and geography courses. Since computers were not in every classroom, we went to stationary computer classes and taught our courses there. Since projection devices were also limited, we were usually looking at relevant information, images, and data on the computer screen in turn. Ibrahim

Umut stated that although he lived in a rural settlement, he had difficulties accessing technology during his formal education process due to the characteristics of the period he started school rather than the effect of the physical environment. This finding can be interpreted as the period conditions are a turning point in the experiences about technology in the formal education process.

> The '90s were the years when I was educated. We haven't seen anything about technology in primary, secondary, and high school education. There was nothing in our courses. Courses at school were taught by teachers using classical methods. We only had books. Umut

On the other hand, Beyza and Aslihan are more fortunate in gaining technology-oriented experiences in the formal education process because it is seen that they have the common technological devices throughout the country in their time; this way, their experiences were enriched.

> We had computer courses in our schools. At that time, we had a computer lab. One computer per two students at most. But it's not what it is now. There were computers with old cases. Apart from that, we haven't seen much technology in our schools. Beyza

> There was a television in the classroom in primary school. I remember sometimes watching cartoons. But there was no overhead projector in the classrooms. There was a hall, a projection room. We used to get there sometimes in courses. There was a computer lab in our secondary school. There was a computer course a week. There was a projection in certain classes in high school as well. We rarely attended these classes. Aslihan

It has been revealed that the use of technology and technological equipment opportunities in the educational life of Social Studies teachers until the undergraduate process have made remarkable changes in their perspective towards the course for some participants and have a limited effect on the others.

It is seen that Umut is the most disadvantaged among the participants in the formal education process in terms of developing the technology perspectives and technological competencies. It is thought that the disadvantaged situation has arisen due to the periodic characteristics and the teachers' new interest in current technologies.

> Our period was rather insufficient in terms of technological equipment. Since computer technology has just arrived, it was difficult for our teachers to be aware of this issue. We were educated with chalkboards. Unfortunately, technology was not available in our classes at the time we were studying. We haven't learned much. Umut

On the other hand, Ibrahim and Hakan think that the formal education process until undergraduate education has a limited effect on technology use. Based on this assessment, it can be said that the technologies used in the classroom are insufficient, and the teaching process is not maintained effectively.

> We could not learn much because we could not use technology much in the courses. Maybe we could get some information randomly on some subjects, such as using a computer and arranging a slide. It did not do much for educational purposes or accessing other information. But because of my curiosity, it guided me more enthusiastically on this issue. Ibrahim

> The use of technology in the classroom didn't make a big impact on me. Because it was in my home from a young age, I could only reach them at certain times at school, but I was always able to reach them when I got home. Since there was not as advanced technologies as today's use in the course, of course, it has contributed in terms of attention, but at a certain level… The courses I took in middle school and high school allowed me to use computer hardware, Microsoft, Word, PowerPoint, Excel. Hakan

Aslihan and Beyza made different evaluations from other participants in gaining technological competence and perspective towards technology. Two participants stated that the technologies used in primary, secondary, and high school education had a developing effect on them and positively affected their perspective towards the courses. This situation can be interpreted as providing sufficient technological opportunities, and effective use of these technologies in the teaching process can have a developing effect on students' capacities and perspectives.

> It was nice to use technology. I liked go to the projection room. The course was more enjoyable because there were visuals. I remember that our high school geography teacher took us to the projection room. I mean, I already liked the geography course, but I can say that the course with projection helped me even more. I thought I was more active. … I learned how projection reflects in middle school. … At that time, technology was not used much, but our teacher taught us Word program, etc. in the computer course. Aslihan

> Word was one of the computer programs that we started to use at first. We learned how to use them gradually. Of course, we develop them later during university, but we learned the first steps in primary and secondary school. Likewise, there were slide programs like PowerPoint. … As for what technology affects the course, it was fun back then. Rather than just working with the book, let's open it from the computer, our teacher makes a presentation, or we do it. It was something that motivated all students. It also made us more aware of the use of technology, I think. Beyza

The Process of Being a Social Studies Teacher, Professional Life, and Instructional Technology

The undergraduate process is a period in which Social Studies teachers' instructional technology competencies are developed. One of the critical points in this process which is carried out through planned experiences, is the participants' technologies and how they use them. From this point of view, it is seen that there are important differences between the participants.

Due to the recent development of technological tools in undergraduate education, the most disadvantaged among the participants is Umut. Umut does not have any technological device in his undergraduate education except a communication tool. It can be said that this deficiency makes the undergraduate period inefficient in terms of instructional technology competence.

> I started university in 2002. I had a push-button phone when I was in my first year. We only used it for communication. There was no internet use. Although I do not have a computer and internet, we started to encounter the internet more frequently from the first class. We were supplying our needs in internet cafes. I was doing this just for playing games. Umut

İbrahim has fewer technological devices in his undergraduate education than the other participants. However, what draws attention to Ibrahim states is that he has a conscious purpose of use. This awareness has made an important contribution to Ibrahim's competence in instructional technology during the undergraduate process.

> When I think about it, the first thing that comes to my mind is the push-button mobile phone. It was used more effectively during the university period. Apart from that, I persuaded my family to buy a laptop because I started my education life and I thought it would be really useful to me. Since my mobile phone is not a smartphone and internet usage is limited, we used the technology in our education process mostly with laptops. I watched videos about courses on my laptop, I was doing my research, found and read articles about my courses and made arrangements for my courses. Most of my study during the undergraduate process was running on a laptop. Ibrahim

Aslihan and Hakan have the technological devices required by their period. They use these devices for their academic development. Both participants used technological devices for communication, homework, and research purposes. It can be said that this situation positively affected the instructional technology competencies of the participants.

> I bought a smartphone at the end of the university's first year. I subscribed to Facebook, Twitter, and Instagram on social media. I already had a desktop computer. Then I bought a laptop. … I especially benefited from the laptop. Of course, we cannot ignore the smartphone. We were especially creating Whatsapp groups to communicate with each other. I was doing my homework from the laptop. I was using Word, Excel, and PowerPoint to do this. Apart from that, I was doing all my internet research from there. Aslihan

> The first year of university, I had a laptop. I also had a smartphone. …Of course I was using the computer. It was a platform where we could share our notes in terms of social sharing, and at the same time, we were using WhatsApp groups as communication from our phone. We benefited a lot from these during the undergraduate process. We could not do some things when I thought neither of them existed. So the computer and phone were very important in my undergraduate life. Hakan

Beyza has the necessary technological devices. However, Beyza's main problem is in its intended use. A shadow use case has arisen here. Although she had the necessary technological devices, she could not use them efficiently for his academic development.

> During the undergraduate process, I had a smartphone and a tablet pc. My family bought these devices for me as I won the university. Tablets rather than laptops were in everyone's hands at that time. We liked to move. … Generally, we used it to learn our grades and to answer the questions asked by the lecturers. Beyza

During the undergraduate study, another important emphasis was placed on the courses taken. There should be an effective education process for instructional technologies in this period of being a teacher candidate. However, when the participants' stories were examined, it was found that technology-based courses were not carried out effectively. This situation had a significant impact on the participants. It has been determined that information technologies, instructional technologies, and material design courses have been carried out over the basic programs and printed materials that have been ongoing for years. The lack of instructional technology programs and Web 2.0 tools is seen as an important deficiency in the participants' ability to use instructional technology.

In particular, Umut states that undergraduate education is unfavourable in terms of providing instructional technology competence. The main reason for this is that faculty members do not have enough competence.

> During the undergraduate process, we have received training on computer usage and the procedures such as installing and uninstalling programs that can be considered indispensable on the computer. Even though I had no chance in the faculty, I got a computer certificate from an outside course. I think there were an instructional technology and material development course in the 3rd year. We only prepared printed material for this course. We prepared something mostly about printed materials. …The undergraduate process was not very effective in gaining instructional technology competence. Our faculty members were not well equipped in this regard. We tried to do something within our means. But if we could improve ourselves in the undergraduate process instead of our means, it would be different now. Umut

From another point of view, Hakan emphasised that the level of technology-related courses he took during his undergraduate education was unproductive, and the courses were not carried out for their purposes. Thus, one of the conclusions drawn from Hakan's statements is that the courses he took during his undergraduate education did not contribute to instructional technology competence.

> We took a computer-related course in our first year of undergraduate. We taught courses in the computer lab. We prepared presentations from Excel, Word, and PowerPoint and learned about how they are used. It was like a continuation of the computer course in middle and high school. … We did not design such technology-oriented materials in the Instructional Technology and Material Design course. Was it a factor to have a teacher who is not interested in technology in this course? I do not know. In this course, mostly everyone designed a printed material after making a presentation. Hakan

It is noteworthy that Ibrahim differentiates the "Information Technologies" and "Instructional Technologies and Material Design" courses that he took during his undergraduate education. He thinks that the "Information Technologies" course had a significant improvement effect on him. But, on the other hand, he emphasises that the "Instructional Technologies and Material Design" course did not have a remarkable effect on him.

> The Information Technology course directly included what we can use while teaching in schools. Since our teachers are conscious, they tried to install permanent information in us; they aroused our interest in technology. In the Information Technology course, I learned almost everything about instructional technology, to prepare slides, to set up a site, to share some information on the site, which sites are not reliable or reliable, to prepare questions for students using the program, to check the answers to the questions on the system.... Instructional Technologies and Material Design course focused more on printed materials. We were not very involved with technology in this course. Ibrahim

The emphasis of Aslihan and Beyza is similar. Both participants took courses with similar procedures during their undergraduate education. Although these courses are not sufficient, it is seen that they impress in their development. They consider it important to develop at least a digital material in the "Instructional Technologies and Material Design" course.

> There was a projection in the first term of our class at the university. Later, a smart board was provided. We were watching videos in the courses. We were watching documentaries. Our teachers were showing slides from PowerPoint. We were preparing a presentation for almost every course. ... We had computer courses in our first year. We learned about Word, Excel, and Powerpoint here. Then, we prepared a book in a computer environment for the Instructional Technologies and Material Design course. Then we even printed that book. Other than that, I don't remember anything specific. Aslihan

> We had smart boards and computers in our classrooms. Both us and our teachers benefited from the smart board. We had an undergraduate education based on presentations. ... We saw the computer course in the first year. We started the course with simple programs such as Word, then saw a different presentation program, Prezi. We saw Excel and PowerPoint. ... We also had an Instructional Technology and Material Design course. Everyone was producing a material. I also designed a digital magazine. At the end of the presentations, we always was doing an activity. We were preparing games on the computer and designing activities instead of giving a paper to the children. We also had friends who prepared a website for this course. Beyza

The most important breaking point in using instructional technology for Social Studies teachers and including them in their courses is the beginning of their professional life. Teachers can make up their shortages in their professional life and improve their instructional technology usage skills. Furthermore, they can benefit from training on educational technologies in line with their wishes or with the support of their institutions. It is noteworthy that in the expressions of the participants, the older teachers make more effort to improve their instructional technology competencies than the youngers. This finding indicates that some teachers put their development in a static process, while others attach importance to continuing their development.

Although İbrahim and Umut are older, they make a significant effort for their development compared to the other participants. They are trying to improve their instructional technology competencies through external courses, in-service training, and social media tools.

> I attended courses on instructional technology during the teaching process. The public education centre created a course, and I attended it. Apart from that, I also attended the tablet training course. I tried to participate in such events as much as possible. We need to keep ourselves up to date. What kind of methods are used, which sites can we use at school? I learned about these. If we start to use tablets, which applications can be used in our classroom, how education should be maintain with tablets, how we prepare tests for students, how we analyse these tests, etc. I got information on these subjects. … There are many videos about instructional technologies. I follow them on the internet, especially via YouTube. I use Twitter a lot, particularly to combine technology and education. I follow what my experts on Twitter do, especially those who are interested in education, and I read what they write. These make a great contribution to integrating technology to our courses. I also follow some people on Facebook and Instagram. Ibrahim

> In 2017, the "Information Technologies" course was started in the province I was in. Those who were willing attended this course. This program continued for a month. I found it beneficial to take the course because of my interest. In its content, we learned important things related to the FATIH project, such as the arrangement and use of smart boards. After this course, I can trim my videos and make them what I want, and I can use my smart board without the need for anyone. … When I search for any training related to instructional technology in in-service training, I cannot see anything. I would make an effort to participate, though. I learned something with my effort. I think I use instructional technology actively because of my curiosity. Umut

Although Aslihan does not attend any course or training for instructional technology competence, she supports her development through social media. The fact that she is doing her master's degree is an indication that she gives importance to development.

> I did not attend any courses or in-service training after I started teaching. Before I was nominated, I was a paid teacher. I was doing a master's degree at that time, and I could not attend due to time problems. But there are channels and accounts I follow about instructional technology on YouTube and Instagram. Aslihan

Hakan and Beyza do not make enough effort to develop their instructional technology competence. They stated that the reason for this situation is that their institutions do not offer opportunities, and they see themselves as sufficient. However, these thinking structures are thought to prevent them from seeing their shortcomings.

> After I was nominated as Social Studies teacher, I did not participate in an education related to instructional technologies. I think I am ahead of most of my colleagues regarding technology literacy because I consider myself competent and I am young. Also, I have not encountered a suitable in-service course for myself. There is no one I follow in terms of instructional technology in digital environments. Maybe there are such channels, but I haven't come across them. Hakan

> I did not attend any training after I started my profession. Some institutions plan these training themselves. No such thing happened with us. Also, I didn't feel inadequate, so I didn't feel the need to participate. … There is no account or education technologist with the instructional technologies I follow on social media. Beyza

A critical question that reveals instructional technology skills in the stories of Social Studies teachers is about which technologies they use in their classrooms. Because it is thought that past experiences will provide important reflections on the implementation process. However, when the participants' stories were examined, it was found that individual characteristics and preferences shaped in-class practices rather than possibilities.

Especially, Umut and Ibrahim are eager to include various instructional technologies in their courses with the influence of their curiosity and interests, as they stated before. Therefore, they employ much up-to-date digital content and instructional technologies in their teaching processes in line with their desire.

> We access and watch videos on YouTube. Again, we use Google Earth program while examining the landforms. For example, we use Google Maps in sketches. In almost every course, I use videos, photos, and cartoons that allow students to get information and have fun. I also benefit from virtual museum tours and animations. We can travel and examine our cultural heritage with virtual tours. We even connect to the city surveillance cameras of different countries while explaining the time difference in our course. Since our school is a private school, it has own software, and I use many tools. … There is an application called Kahoot that works very well in evaluation. I apply it when the students bring the tablets. I take short videos and photos of the places I visit during the holidays and bring them to the classroom. Although not very often, I benefit from the Information Network in Education (EBA). There are online tests, and we solve them. There are some websites related to Social Studies; I am not naming them now. I also play educational games here in the classroom. For example, there was a basketball game about the Revolution History. Ibrahim

> It is different to explain something to the student by supporting it with visuals. We make presentations on the smart board. We repeat an event that happened through videos. We use Google Earth, especially when explaining geography-related issues. We use digital forms of some books and tests. We do virtual tours in our course. For example, we visited Topkapı Palace with my class. I use the Information Network in Education (EBA) and the Morpa Campus sites. Especially at EBA, I can follow the development of children. There are good animations in EBA, and I use them too. Maybe in the future, we can explain the subjects of history through virtual reality. I've also heard of tools about online evaluation, but so far, I haven't been able to spare time for them. Umut

On the other hand, Beyza, Hakan, and Aslihan show a limited use reflex for instructional technology, with more presentations and videos. One of the important reasons for this situation may be that they do not make enough effort to fill their deficiencies in instructional technology after their professional life begins.

> We use instructional technologies. I also teach in eighth grade. Our course is about history, so children are curious about something behind the scenes. When students have something they are curious about, I can open it and show it to them using my computer. If the computer is not available at that moment, I can open it from my phone and show it. I direct children to appropriate sites so that they can access accurate information. They can get information from there. Beyza

> We have a smart board. I use it. Apart from that, I bring my computer, connect it to our smart board and use it when there is something I need to show. I use the internet and video-sharing sites. I show students videos on YouTube. The things we can do in the Social Studies course are limited because it is a historical subject since we cannot go back to the past. So, I make the students watch the films of that period or the cartoons and animations from time to time. Hakan

> I use EBA. Usually, I pose questions to children from there. I prepare a presentation myself so that the subjects gain visualise, and I bring them to the course. I make videos, and I use them. Apart from that, I use educational games on the smart board. Aslihan

Results and Discussion

Employing instructional technologies in courses stands out as a necessity of 21st-century teaching processes. Social Studies teachers should also be competent to use instructional technology and blend these technologies with an appropriate pedagogical method and relevant field knowledge to make the teaching process more effective. However, this situation takes place on the axis of different experiences for each teacher. Narrative research, a research method based on the interpretative paradigm, is used to reveal such experiences. In this study, the experiences of Social Studies teachers in instructional technologies and their reflections on their courses were examined. As a result of the research, four main results have been reached.

The first and most striking of these is that the participants will develop their instructional technology usage skills in line with their interests after their professional life begins, despite their past impossibilities. At this point, it should be considered that an important factor that reveals this interest is parental approaches in their early childhood. A study supporting this result was conducted by Debele and Plevyak (2012). Researchers have concluded that Social Studies teachers' technology integration skills can be improved due to their participation in research processes after their professional life begins and their cooperation with researchers. In the study conducted by Hao and Lee (2015), it was stated that teachers who have a high interest in technology integration in the teaching process attach more importance to new applications and are more effective in including new technologies in the implementation process. Another research supporting this result was conducted by Kim et al. (2013); the researchers concluded that although many factors affect teachers' technology integration skills, their personal beliefs especially play an important role in this process. A similar conclusion was reached by Tondeur et al. (2016). In the study conducted by Vanatta and Nancy (2014), it was stated that teachers who develop themselves in the use of technology outside the classroom and want to learn technology are more likely to use technology in the classroom. In the national literature, the study conducted by Bal and Karademir (2013) emerged the importance of individual concern in a way that supports this research. This study concluded that teachers who received in-service training for information and communication technologies in line with their desire improved their technological competence more than those who did not. Similarly, Ersoy and Bozkurt (2015) concluded in their research that teachers can improve their technology use skills in education and affect their colleagues positively with their individual interest in technology.

Another result of the study is that Social Studies teachers have limited technological opportunities in their learning processes and these limited opportunities prevent them from developing their technology use skills. A study that confirms this result was carried out by Wilson (2003). It is stated in the study that barriers such as lack of technological equipment and internet access made it difficult to integrate technology into Social Studies teaching. The importance of having technological possibilities in the teaching process was also revealed in the study conducted by Sad and Nalcacı (2015). It has been concluded that preservice teachers who have computers have higher competencies in information and communication technologies. Besides, in the study conducted by Saygıner (2016), it was found that preservice teachers who have computer and internet access have higher technological competence. Similarly, Pamuk and Peker (2008) found that preservice teachers with computers have high computer self-efficacy and attitudes towards computers. An opposite result from our study was reached by Gercek et al. (2006). In their study, the researchers concluded that teachers' conditions of access to computers do not affect their computer usage skills.

The undergraduate process is a breaking point in shaping Social Studies teachers' experiences and capacities about instructional technology. Another result in this direction is that the participants did not reach desired competence about instructional technology in the undergraduate education process. However, there are individual differences in terms of instructional technology. The instructional technology competencies of teacher educators working in education faculties may be an important factor that reveals this deficiency. Wright and Wilson (2009) concluded that it is important for teacher educators to demonstrate good practices related to instructional technology to preservice teachers in the undergraduate process to increase their competencies and teach how technology, content, and pedagogy can be integrated. Similarly, in his research with university students Wilfong (2006) found that the technology anxiety levels of the participants were influenced by their computer self-efficacy beliefs, not by the frequency of computer use or computer experience. In their research, Andersan and Maninger (2007) concluded that preservice teachers' enrolling in educational technology courses has a developing effect on their technology integration skills, self-efficacy, and beliefs. In another study, Nelson and Hawk (2020) concluded that gaining the belief that technology is beneficial in the teaching process in undergraduate education will save preservice teachers from the simplification process, such as only showing a PowerPoint presentation and will affect their professional development. Kabakci-Yurdakul (2011) stated that it is important for teacher candidates to gain techno-pedagogical content knowledge in undergraduate process because there is a relationship between their beliefs about technology integration and their use of technology after starting their profession. Pamuk, Ulken, and Dilek (2012) stated that preservice teachers did not have sufficient basic knowledge on effective technology use, and they considered themselves inadequate in technology use. They suggested that the shortcomings of preservice teachers on this issue should be eliminated. Additionally, in the study conducted by Kaya and Yazıcı (2019), it was concluded that Social Studies teachers who received training in information and communication technologies had higher techno-pedagogical education competencies than those who did not.

Finally, it was concluded that Social Studies teachers with more years of professional experience were more willing to realize their shortcomings, cooperate to overcome them and use teaching technologies more effectively than teachers with less professional experience. An opposite result was found in the study done by Hu et al. (2003). The researchers stated that as teachers' years of professional experience increased, their level of technology acceptance decreased. In the study conducted by Cheng and Xie (2018), a negative relationship was found between the professional experience years of teachers and their standard technology knowledge. However, in a study conducted by Niess et al. (2006), it was concluded that teachers who have just started the profession have insufficient pedagogical knowledge, and their level of linking between technology, pedagogy, and content is low. In the national literature, a result opposite to our research was reached by Ozgur (2020). In the study, it was found that as the age of teachers increased, their technostress levels also increased, and teachers with less experience were able to cope with technological processes more effectively. Similarly, in the study conducted by Akturk and Delen (2020), it was concluded that teachers with less professional experience had higher technology acceptance than teachers with more experience. On the other hand, Demirezen and Keles (2020) found no relationship between Social Studies teachers' technological pedagogical content knowledge and professional experience level. Similarly, in the research conducted by Altun (2013), it was concluded that the professional experience year did not affect the techno-pedagogical content knowledge of the teachers. These results can be evaluated as the effect of professional experience factor may create different effects in line with the individual characteristics of Social Studies teachers.

Although this research examines the effect of Social Studies teachers' life experiences in including instructional technology in their courses, it has some limitations. The main limitations are that only the interview method is used as a data collection tool and a small study group. To eliminate these limitations, survey studies that allow studying with large participant groups can be designed. Besides, more detailed data can be obtained within qualitative approach by enriching data collection tools with triangulation. By designing case studies, participants' experiences of instructional technology implementations in their classrooms can be revealed. Within quantitative research approach, factors affecting the instructional technology competencies of social studies teachers can be investigated with modelling studies. The data of this research includes an interview process that lasts for three sessions. By extending this process further or repeating the interviews in the following years, the development of Social Studies teachers' skills in using instructional technology can be examined in more detail. Finally, the problems in our research can be tested with different data collection tools.

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A Qualitative Research on Competency-Based Learning Management System and Its Effectiveness

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Abstract. This research aimed to reveal the effectiveness of the Akhi Competency-Based Training Project (ACBTP, called AYDEP), a distinctive learning management system based on user views. The research was designed as a case study, one of the qualitative research methods. The study group of the study consisted of the first-year pre-service teachers and instructors in the Classroom Education Department of a state university in the fall semester during the 2018-2019 academic year. A semi-structured interview form was used as a data collection tool. The data were analyzed with the content analysis method. The results showed that, in general, the system was used for course planning, assessment-evaluation and communication purposes. While the system facilitated planning, supported communication and was easily accessible, it had some limitations as well. Providing user support throughout the process in such systems can increase effectiveness.

Keywords: Learning management system, teacher training, competency-based training

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Introduction

Technology, which has become an integral part of our lives, affects education in its entirety (Gloria & Oluwadara, 2016). While technology is becoming increasingly common in the education sector, its use has become a requirement in teacher training as well and has completely transformed the concept of teacher training (Sendag & Gedik, 2015). The increase in the duration of technology use has made technology a motivational tool for students. On the other hand, providing education in line with the interests and expectations of students who have grown up with technology has made it a necessity for teachers to use technology competently. Through technology, teachers can contribute to their professional development and communicate with their colleagues and students (Gloria & Oluwadara, 2016). However, teachers' beliefs regarding technology use, their unwillingness to change, and established classroom practices can prevent technology integration into classrooms (Ertmer, 1999). For this reason, it is important to provide teachers with training on the use of technology, starting with pre-service training. Many countries integrate practices for the effective use of technology in teacher training programs (Kimmons et al., 2015). Having rich experiences in these practices contributes to pre-service teachers' professional development. Technology-intensive applications make important contributions to the techno-pedagogical development of pre-service teachers. In this way, it becomes easier for teachers to follow technological developments and reflect them on their teaching practices.

Elimination of requirements, such as time and space in learning is an important development that emerged with the use of technology in education. The concept of electronic learning (e-learning) is an important addition to the educational literature, thanks to technology. E-learning environments, which are developing more and more with the possibilities offered by technology, offer distance and interactive learning opportunities to users. Also, reasons, such as economic competitiveness, lifelong learning opportunities, social equality and access, better training options, cost-effectiveness and geography are among the reasons for preferring distance learning, open learning and electronic learning environments (Bates, 2005). In addition to these environments, the emergence of learning management systems based on technological infrastructure is another significant development in training. A learning management system is a complex system in which e-learning, computer and internet technologies are used together (Erdogdu & Sahin, 2018). Many instructional processes are carried out more effectively and bring a certain discipline to the teaching process using these systems in educational environments.

Learning management systems are software developed to manage learning activities (Altiparmak et al., 2011). Many operations and procedures used in the traditional learning processes can be implemented faster and more securely through learning management systems. The main functions of learning management systems, which offer a comprehensive and systemic process to educational environments in the recent information age, are recording student learning, course planning, teaching and evaluation in addition to their secondary functions (communication, keeping students' general data, school staff information and system management) (Reigeluth et al., 2008). Learning management systems are learner-oriented systems, monitoring the learning needs and outputs of the individual over periods of several years (Simonson et al., 2008). These systems also include the management of course content (Ates & Guyer, 2016). The learning management systems allow operations, such as the management of all kinds of information and documents related to courses, keeping records of all types of data related to students, sharing course content, assigning homework and exams, giving feedback on assignments and exams, creating a discussion environment and taking reports (Altiparmak et al., 2011). Carrying out these processes over the system has many advantages for administrators, teachers and students. On the other hand, learning management systems with dynamic structures can be developed according to the needs of specific institutions or individuals and may include different aspects. Systems aiming to achieve learning goals and increase student achievement have the potential to positively affect the quality of the education process as a whole.

Akhi Competency-Based Training Project as a Distinctive Learning Management System

Akhi Competency-Based Training Project (ACBTP, called AYDEP) is a distinctive learning management system that aims to increase the quality of education and adopts a competency-based learning approach. AYDEP, which has developed principles for all stages of the teaching process, has an infrastructure that can be used in all higher education institutions that provide advanced vocational and specialty training and adopt competency-based education. AYDEP was developed by Kırsehir Ahi Evran University, which identified the competency-based training as its strategic goal (2015-2019 Strategic Plan, 2014), and it was first piloted in the Faculty of Education in the 2018-2019 academic year. After two years of pilot implementation, it was decided to use the competency-based training management system in all associate degree programs, undergraduate programs and graduate programs of the university as of the 2020-2021 academic year.

The Project was named after the akhilik, which has its roots in the 13th century, emphasizing vocational education and professional ethics principles. The guild approach, whose framework was shaped by its founder Ahi Evran-ı Veli, mainly focuses on qualified vocational education. The Ahi community, which was initially based on the acquisition of human virtues and the multi-directional development of people, was later organized as a guild that controlled the production and consumption processes and was organized as a semi-independent non-governmental organization (Akbas et al., 2018). The guild, which has adopted the principle of producing quality goods and services, sets a good example from the early periods to today’s modern societies’ search for consumer-oriented market and quality. Quality is regarded as a lever in today's developmental modern societies’ race for superiority. At the same time, the quality that provides a competitive advantage is used as the leading concept in the production of qualified goods and services. However, quality is the result of production and is based on qualified manpower. Therefore, starting the search for quality with the education sector is an accurate choice. As a matter of fact, training qualified people is only possible with a quality education. Teachers are the main factors affecting quality in the education sector because teachers are one of the basic building blocks of the education system. In other words, teachers are among the most strategic parts of the social systems called schools (Bursalioglu, 1994). The quality of teachers, who have the power to influence the system as a whole, depends on quality training before starting service. Hence, improving teacher training and teacher development processes is an important factor in increasing the effectiveness of the education system (Kose, 2016).

Improving educational processes in higher education and ensuring a certain standard has become one of the most emphasized issues during the 2000s. A reform process was initiated in 1999 to improve European higher education. The ultimate goal of this initiative, called the Bologna Process, is to develop standards in academic matters and to create a harmonious higher education field in Europe. Following the meeting in Prague in 2001, Turkey declared its intention to be a part of the Bologna Process and conducted a series of studies under the Bologna process in subsequent years. In this context, Bologna Coordination Committees were established in all higher education institutions throughout Turkey. As a continuation of the Bologna Process, Turkey became a party to the Leuven Declaration in 2009 and adopted the principle of establishing comparable and competitive structures in higher education systems. Within the scope of the Bologna Process, practices and actions were carried out by the Council of Higher Education to improve the academic and administrative service quality of higher education institutions and to develop a quality assurance system. For this purpose, Regulation for Academic Evaluation and Quality Improvement in Higher Education Institutions was prepared and based on this regulation, Higher Education Academic Evaluation and Quality Improvement Commission (YODEK) was established by the Inter-university Board (YODEK, 2007). Identification of the National Qualifications Framework was another important undertaking initiated within the scope of the Bologna process. In this context, Law No. 6111 issued in 2011 declared that higher education institutions would associate course credits with student workload and establish Turkey Higher Education Qualifications Framework (TYYC) (TYCC Regulation, 2011).

With the establishment of TYYC, the “National Qualifications Framework,” which was adopted by the member countries of the Bologna Process, was identified in Turkey as well. National Qualifications determine the criteria of what individuals will know, what skills and competencies they will obtain after graduation. National Qualifications Framework describes the qualifications and their interrelationships in an education system at the national level. With this system, all qualifications and other learning outcomes in higher education can be explained and correlated with each other. In addition, the learning outcomes expected during and after the teaching process of each course / module are identified as an indicator of the degree of acquisition of the determined competencies.

Theoretically, this research focused on competency-based training. Competency-based training, originating from system theory and behavioral approach, emerged from the performance-based teacher training approach of the 1960s developed in response to the problems regarding the quality of teacher training programs in the USA (Hodge, 2007). In competency-based training, there is goal-based learning and competencies are at the forefront in all stages of curriculum design. Learning objectives are determined according to the competencies and the contents of the relevant disciplines are prepared in accordance with these competencies. In addition, competencies guide the way in ordering the subjects, planning and evaluating instructional activities (Albir, 2007).

AYDEP, based on the competency-based training approach, uses software that can perform all processes in education electronically. AYDEP has a systematic and technological infrastructure that can be used in face-to-face education, distance education or hybrid education models. The system aims to improve training processes and increase the quality of learning outcomes by creating a competency-based training design. Based on the teacher competencies identified by the Ministry of National Education, AYDEP infrastructure enables to plan each course in a manner to serve the teacher competencies and to monitor whether these competencies are acquired. The educational paradigm of our age requires informing the stakeholders about students' learning process, ensuring that progress is continuous and personalized and making good decisions about the next steps in training (Reigeluth et al., 2008). AYDEP, which provides useful solutions for teachers and students at all stages of the learning process and utilizes a competency-based measurement and evaluation approach, is based on the following principles (Kırsehir Ahi Evran University, Faculty of Education AYDEP Implementation Directive, 2018):

- It guarantees the right to learn.
- It focuses on learning and the multidimensional development of students.
- It is based on student-centered training.
- It aims to ensure the acquisition of predetermined qualifications.
- It is based on the harmony between the program competencies and the learning outcomes of the courses.
- It is based on the harmony between the learning outcomes of the courses and teaching practices.
- It is based on providing rich teaching materials and an interactive teaching environment.
- It is based on the use of a measurement and evaluation model targeting the qualifications and learning outcomes of the courses.
- It is based on conducting a joint examination for the same course.
- It is based on evaluation and continuous improvement of the programs.

Purpose of this Research

Countries seeking quality education have focused on establishing and developing learning management systems. Today, different learning management systems are used in education processes. Effective, efficient and satisfactory use of learning management systems is important for efficiency and quality in education (Ates & Guyer, 2016). AYDEP learning management system developed to ensure that teacher training processes are carried out in line with competency-based training approach; learning management system is regarded as an effective practice to train qualified teachers. AYDEP learning management system, the subject of this research, utilizes a competency-based structure; however, there is no information about the effectiveness of AYDEP in training pre-service teachers. Evaluating educational systems or applications from various perspectives by educators and learners is a basic requirement to improve the quality of education. The results obtained through such research will demonstrate and strengthen the negative aspects of these systems or applications.

This research was conducted to determine instructors' and students' views on the use of the AYDEP learning management system, which was developed to increase the quality of education in higher education institutions and establish a quality assurance system in education. Within the scope of this research, instructors' and pre-service teachers' views on the effectiveness of the AYDEP learning management system were examined from various aspects based on the research problem "What are the effects of using a competency-based learning management system in training pre-service teachers?". The results of this study are expected to contribute to the literature regarding the contributions of using competency-based learning management systems in teacher training.

Method

Research Design

This research was designed as a case study, one of the qualitative research methods. Case study is a qualitative approach that allows in-depth examination of one or more situations that exist in a limited context (Creswell, 2007). Researchers focus on the questions of how and why in case studies and a phenomenon or event that the researcher cannot control is examined in-depth (Yildirim & Simsek, 2011). The use of competency-based learning management system in the Classroom Education Department in a Faculty of Education at a university was the case examined in this study. This research method was selected because this study aimed to analyze this circumstance from various aspects and in-depth under its own specific conditions.

Study Group

The study group of this research was composed of pre-service teachers and instructors. The pre-service teachers in the study group consisted of first-year pre-service teachers studying in the Classroom Education Department, Department of Primary Education of the Faculty of Education of a state university in Central Anatolia in the fall semester during the 2018-2019 academic year and the instructors teaching these pre-service teachers at the same timeframe. This study group was selected the pilot implementation of AYDEP learning management system was done in this group. Purposeful sampling technique was used to select the pre-service teachers in the study group. The criteria and steps for selecting the participants were as follows:

1. *Satisfaction:* All pre-service teachers who utilized the AYDEP system were asked to rate their satisfaction from the AYDEP system: "Please indicate your level of satisfaction with the AYDEP system you have used in your courses?" The rating included the following options: options 1="Not Satisfied At All", 2="Not Satisfied", 3="Partly Satisfied", 4="Satisfied" and 5="Very Satisfied". Based on the feedback, groups were formed according to their level of satisfaction. At this stage, 84 feedback were received and accordingly, 11 pre-service teachers were "not satisfied at all", 15 "not satisfied", 26 "partially satisfied", 22 "satisfied," and 10 "very satisfied."

2. *Frequency of Use:* The second stage addressed the criterion of using AYDEP frequently. The pre-service teachers who were grouped based on their satisfaction from the AYDEP system in the first stage were identified based on whether they frequently used the system. Three pre-service teachers who frequently used the system were identified from each satisfaction level. AYDEP system keeps track of the time spent by the users on the system. Hence, three pre-service teachers from each satisfaction level were identified through the system records. In this way, 15 pre-service teachers who frequently used the system with different satisfaction levels were included in the study group. Thus, a working group was formed to represent all positive and negative views among the users of the system. In addition, the inclusion of frequent users in the study group was important to have a better idea about the system.

3. *Using the System:* Using the system in teaching was identified as a criterion to determine the instructors that would be included in the study group. Eight instructors were included in the study group based on this criterion.

Implementation Process

The university has ownership of the working principles and software algorithm of the AYDEP learning management system. Professional support was obtained from a software company in converting the determined algorithm into the software. The researchers who conducted this study had no conflict of interest with the company that developed the AYDEP learning management system software. AYDEP learning management system, the subject of this research, was used to increase the quality of education. The AYDEP system included the definitions of program competencies, course subject lists for 14 weeks and the definitions of learning outcomes and acquisitions. AYDEP facilitated the required procedures in the teaching process, such as communication between students and teaching staff, creating a discussion environment, sharing materials regarding topics and outcomes, defining and assigning homework. Preparing outcome-oriented questions and evaluating learning outcomes could be cited among the important features of the AYDEP system. Exams could be given electronically or by taking printouts of the questions registered in the system, considering the characteristics of the course and the subject and the preferences of the instructors and pre-service teachers. Remote live lectures were also available in the AYDEP system with the help of an open source video conference system integrated into it. During the pandemic in the spring term of 2019-2020, the user university conducted all its courses live through the AYDEP system, thanks to this feature.

Students and instructors can use the AYDEP system by accessing the computer browser or mobile application with the user name and password provided to them by the university. Supporting learning management systems with mobile applications eliminates dependence on time and space and provides great convenience and freedom in user access to information (Elcicek & Bahceci, 2017). The AYDEP system implemented as a pilot in the Faculty of Education allows the instructors to initially see the accepted program competencies in teacher training and determine the course learning outcomes of their own courses in line with these competencies. In addition, student acquisitions for the identified learning outcomes are defined in the system through concrete behavioral statements for each week with the information packages required for these outcomes and information on how and with which questions these outcomes will be measured provided as well. Its competence/ outcomes-based evaluation system is one of the most distinctive aspects of the AYDEP system. Instructors have a question pool consisting of question(s) to be used in measuring and evaluating the determined competencies/ outcomes before the teaching process begins for each course. Preparing a certain number of questions for each outcome enables instructors and pre-service teachers to focus more on the teaching process and learning. The fact that a certain number of questions are prepared in advance for each outcome allows the instructors to focus on the realization of the outcomes while it prompts the pre-service teachers to make self-evaluations about the extent of their learning. Preparation of exam questions in accordance with the level and characteristic of the outcomes fills the gap between teaching and evaluation. Learning outcomes, acquisitions and questions prepared to measure these outcomes are assessed by field experts and required adjustments are made. After the exams are held in the electronic environment, students can access their exam papers and examine the analysis reports for their exam evaluation. After the exam, the difficulty level and discrimination level of each question is automatically provided by the system and the instructor is given immediate feedback about the nature of the question. In this way, it is possible to remove unsuitable questions from the system or correct them. The system ensures taking course and exam attendance rapidly with the mobile application via the QR code method. The system also enables bilateral and mass communication and interaction between students and instructors, sharing lecture notes, sharing resources, forum activities, sharing announcements, messaging and creating feedback for the course.

There are support offices within AYDEP that require interdisciplinary cooperation. Thus, the encountered problems in the operation of the system can be solved quickly and professionally. There are four different support offices within the scope of AYDEP: Program Evaluation Support Office, Instructional Technologies Support Office, Measurement and Evaluation Support Office and System Support Office. Instructors can communicate with the chairman and members of support offices through the AYDEP database. This link is used to open a discussion topic, forward a request and communicate.

Data Collection Tool

A semi-structured interview form was used to collect research data. This form was developed by the researchers to investigate pre-service teachers' and instructors' views on the effectiveness of the system. Four instructors working in support offices were consulted to obtain expert opinion while the form was developed. Necessary adjustments were made in line with these expert opinions and later, an instructor who had used the system before and a pre-service teacher who was not included in the study group were interviewed to test the form and determine whether there were any incomprehensible questions. The form was finalized after making the necessary corrections in this regard. The interview form consisted of 10 items about the purpose of using the system, its effect on the course learning outcomes and acquisitions, its effect on the teaching process and implementations, its desirable and undesirable aspects, the problems experienced in the system, and the areas that need to be improved. Two examples for questions included in the form are as follows: "For what purpose did you use the system the most? Please explain." and "What do you think about using the system for exams and assignments?"

Data Collection and Analysis

Research data were obtained from the interviews conducted with the study group. Before the interview, instructions were first read to the instructors and pre-service teachers included in the study group. Later, the interviews were recorded with a voice recorder with their permission. Interviews were conducted individually and face to face. Each interview lasted an average of 20 minutes with the instructors and 10 minutes with the pre-service teachers.

Data were analyzed using the content analysis method. First of all, the participants' recorded views were analyzed and transcribed during this process. Then, the data were coded by two coders and reliability was calculated. High consensus between coders increases the reliability of qualitative research (Creswell, 2013; Fraenkel &Wallen, 2008). The consensus among coders was obtained with the following formula:

[consensus/(consensus + disagreement) x100]

and it was found to be as 85.9% (Miles & Huberman, 1994).

Findings

This section presents the findings obtained from the analysis of the research data.

Table 1.

Themes and Sub-themes regarding Using the AYDEP System

Purpose of Use	**Instructor**	**Pre-service Teacher**
Planning the course	+	+
Measurement and evaluation	+	+
Communication	+	+
Desirable Aspects	**Instructor**	**Pre-service Teacher**
Time-space independence	+	+
Measurement and evaluation	+	+
Providing information about the objectives	+	+
Supporting the teaching process	+	+
Undesirable Aspects	**Instructor**	**Pre-service Teacher**
Technical problems	+	+
System compatibility problems	+	+
Other limiting problems	+	+
Problems that are Experienced	**Instructor**	**Pre-service Teacher**
Technical issues	+	+
System compatibility issues	+	+
Problems with support offices	--	+
Solving Problems	**Instructor**	**Pre-service Teacher**
Receiving support from the technical personnel	+	+
Individual solutions	+	+
Its Effects on Acquiring the Teaching Objectives of the Course	**Instructor**	**Pre-service Teacher**
Making the course planned	+	+
Providing an interdisciplinary perspective	+	--
Providing time-space independence	--	+
Its Effects on the Teaching Process and Practices	**Instructor**	**Pre-service Teacher**
Ensures planning	+	+
Ensures easy access	+	+
Limiting aspects	+	+
Its Use for Exams and Assignments	**Instructor**	**Pre-service Teacher**
Positive for assignments	+	+
Negative for assignments	+	--
Positive for exams	+	+
Negative for exams	+	+
Using the System in other Lessons	**Instructor**	**Pre-service Teacher**
Willingness to use	+	+
Reluctance to use	+	+
Aspects that Need Improvement	**Instructor**	**Pre-service Teacher**
Flexibility	+	+
Adaptation support	+	+
Technical aspect	+	+

Table 1 presents the themes obtained from the views of instructors and pre-service teachers who evaluated the AYDEP Learning Management System: the purpose of use, desirable aspects, undesirable aspects, the problems that are experienced, solving problems, its effect on acquiring the teaching objectives of the course, its effects on the teaching process and practices, its use for exams and assignments, using the system in other lessons and the aspects that need to be improved. Sub-themes and codes for each theme are explained below.

Purpose of Use

Both instructors and pre-service teachers were found to use the system for planning the course, measurement-evaluation and communication. However, the system was used for the same purposes by instructors and pre-service teachers with different intensity. Within the scope of planning the course, the instructors used AYDEP mostly to *add weekly topics, take attendance, add goals and objectives, ensure that students are prepared for the course, share course content* and *inform students about the objectives*. Within the scope of measurement and evaluation, the participating instructors were found to use the system for *adding questions, making exams* and *giving assignments*. Finally, instructors used the system for communication purposes to *share announcements, read the suggestions,* and *send messages*. An example for instructors' views about why the system was used is provided below:

> After having been assigned to the course at the beginning of the semester, we first assigned our lesson, divided the subjects into weeks, and entered the subjects by determining the goals, sub-goals and outcomes for each subject. At the same time, I added lecture notes to each week's topic for the students to use, and every week I opened them in advance and I believe that the students saw these notes and used them to prepare for classes. However, I don't know how useful they were after all. I guess system administrators probably see it, I mean, they see how often students log in and out of the system. (I4)

Just like instructors, pre-service teachers also used the learning management system more for planning the course. Within the scope of planning the course, pre-service teachers were found to use the system to *access their lecture notes, track absenteeism, examine weekly topics, examine goals and outcomes* and *view the course schedule.* Within the scope of measurement and evaluation, pre-service teachers were found to use the system to *check their grades, upload assignments* and *prepare for exams*. Pre-service teachers used the system for communication purposes *to follow notifications, follow announcements* and *send messages.* An example for pre-service teachers' views about why the system was used is provided below:

> What I love the most is the immediate access to notes, to outcomes. Setting the goals for the exam based on the outcomes, deciding which subject we will study and downloading those notes as PDF is one of my favorite and most used purposes. (P11)

Desirable Aspects of the System

The desirable aspects of the system were collected under four headings. Accordingly, both instructors and pre-service teachers expressed their appreciation for the AYDEP system due to its independence from time and space, its ease of measurement and evaluation, its advantages in informing about the objectives and its support for the teaching process. In terms of time-space independence, the instructors liked the system mostly for *instant communication, the attendance system, remote control* and *allowing students to follow the lesson*. Concerning measurement and evaluation, instructors liked the system for *standardization of lessons and exams, preparation of questions based on outcomes, ensuring the content validity of exams* and *revealing the degree of goal achievement*. The desirable aspects within the scope of providing information about objectives included the ability of the system to allow students *to see the scope of the course and writing the outcomes* and *competencies*. Finally, in terms of supporting the teaching process, instructors stated that *access to the course grades, having support offices* and *contribution to education and training were among the favorable aspects of the system*. An example for instructors' views about the desirable aspects of the system is provided below:

> Actually, if the system is used well, the students can access messages more quickly. Contact with the student is provided from the system, by writing a message; that is nice. Also, if you are giving a test on the system, we can say to the student, that is what you get. They cannot say - you gave me a low grade, you gave me a high grade-. Objectively, everybody knows the right or wrong, the grade they received, and that's why it is nice. (I7)

Regarding its independence from time and space, the pre-service teachers mostly liked the system for *accessing their grades immediately, attendance system, easy access, instant communication* and *uploading the assignment from the system*. Concerning measurement and evaluation, *preparation of questions according to the outcomes* and *transparency of evaluation* were cited by pre-service teachers as favorable aspects. The desirable aspects within the scope of providing information about objectives included the ability to track *the flow of the course* and *ability to become ready for classes*. Finally, in terms of supporting the teaching process, pre-service teachers liked the system for *easy access to the course grades,* and *interaction*. An example of pre-service teachers' views on the favorable aspects of the system is presented below:

> The exams were easy because they were on the internet. The results are explained immediately, we do not have to wait. We can see the subject to be covered every week through the system. The topics covered in the course are added to the system as lecture notes. It makes it easy to follow the course. (P2)

Undesirable Aspects of the System

Both the instructors and pre-service teachers stated technical problems, adaptation problems and other restrictive/limiting problems among the undesirable aspects of the system. Some of the instructors cited *interface problems* and *problems in uploading assignments as technical problems*. Undesirable aspects within the scope of system adaptation problems were issues, such as *unfamiliarity with the system, lack of support for instructors* and *lack of information about the system*. Limiting or restrictive issues were found to be *inability of the system to support different exam types* and *restricting the teaching staff*. An example from instructors' views about the undesirable aspects of the system is provided below:

> … for example, when I want to repeat the content of the lesson in the table of specifications let's say, for tomorrow, when I want to check it again, I have to always renew the page. I want to see it all in preview mode, or when I want to add something, I always have to go back, it confuses me… (I5)

Like their instructors, the pre-service teachers also pointed to interface problems and problems in uploading assignments as technical problems. Similarly, *unfamiliarity with the new system* emerged in regards problems in adaptation to the system. Finally, *the stress of taking the exam online* and *inability to use the system without the internet* appeared as limiting problems. An example of pre-service teachers' views on the undesirable aspects of the system is given below:

> …those who do not know the system may experience difficulties for example during the exam. What we are talking about now was also mentioned in class today. For example, we have a lot of trouble in the test questions of paragraph topics. We learned to take tests by underlining as we read. There is no tool here to draw with. If there was a drawing box next to it, for example, it would be more active. That would be better in tests because our topics are paragraph topics. (P7)

Problems that are Experienced in the System

Instructors stated the problems encountered in the use of the system as technical problems, problems with system adaptation and problems with support offices. The pre-service teachers reported that they experienced technical problems and system adaptation problems. *Problems with the interface, delivery of announcements,* and *the problems in uploading assignments to the system* were cited by the instructors as the most common technical problem. They pointed to *lack of training* regarding the problems experienced with system adaptation. Finally, within the scope of the problems related to support offices, they cited *the process of approval for the topics and questions*. An example from instructors' views about the problems experienced in the system is given below:

> When I shared an announcement on the mobile application, it was not sent to the students as a notification. I experienced such a problem. Or, as I said, when the students were uploading their assignments, I was not able to see them although they had uploaded their files. That happened because our students were trying to upload their assignments by clicking on the notifications. But the interface that appears when you click on the notifications is a different interface which does not allow uploads. We let the technical staff know about these problems. (I1)

Pre-service teachers also emphasized *the problem of uploading assignments* and *interface problems* as the most encountered technical problems in the system. *Lack of training* and *stress of taking the exam electronic* were expressed as problems experienced within the scope of system adaptation issues. An example of pre-service teachers' views about the problems experienced in the system is given below:

I've just experienced problems in the exam, technical stuff. We were carrying system stress rather than exam stress. We were afraid of the system. (P5)

Solving the Problems that are Experienced in the System

To solve the problems experienced in the system, instructors and pre-service teachers mentioned two different strategies: receiving support from the technical staff and solving them with individual methods. Instructors pointed to *system administrators, live software support* and *the software company* regarding receiving support from technical staff. Instructors tried to *solve issues with their own efforts* regarding using individual methods to solve the problems experienced in the system. An example from instructors' views about solving the problems experienced in the system is given below:

We tried to solve these problems by receiving support from the unit established by our university regarding the AYDEP system in order to solve these problems. (I6)

Regarding solving problems with individual methods, the pre-service teachers stated that they preferred *receiving support from the instructor or solving problems with their own efforts*. Within the scope of receiving support from the technical staff, pre-service teachers stated that they received support *from system administrators*. An example of pre-service teachers' views about solving problems experienced in the system is given below:

I told the instructor who took care of the system. He gave me a new password. He said -Okay, try again now, we renewed the system- that's how we solved it. (P4)

The Effects of the System on Acquiring the Teaching Objectives of the Course

Regarding the effects of the AYDEP system on acquiring the teaching objectives of the course, the instructors' views were center on the sub-themes of making the course planned and organized, providing an interdisciplinary perspective and providing time-space independence, while the sub-themes of making the course planned and organized and providing time-space independence emerged as the common views for pre-service teachers. Under the sub-theme of making the course planned and organized, the instructors pointed to the following: *clarification of goals and outcomes, disciplining, systematization* and *finding questions about each outcome*. Under the sub-theme of providing an interdisciplinary perspective the instructors pointed to *approval of the questions and outcomes*. An example from instructors' views on the effects of the AYDEP system on achieving the goals and objectives of the course is presented below:

… It has now become a little more concrete. Of course, it is like taking the job a little more seriously while determining the topics of the course while the course is being taught. In other words, it created a perception of feeling like an academic. ... This helped, of course. Does this happen in theory or in real life, it is not possible to follow this, of course, a communication between the teacher and the student is not possible to know the subject very much, but of course it is a case with benefits on paper. (I8)

Under the sub-theme of providing time-space independence, pre-service teachers pointed to accessing the topics before classes, easy *access to lecture notes* and *ability to follow the lesson even when they were not physically in class*. Under the sub-theme of making the course planned; pre-service teachers *emphasized learning about the scope of the exam, being aware of the objectives* and *having exam questions about each outcome*. An example of pre-service teachers' views on the effects of the AYDEP system on achieving the goals and objectives of the course is presented below:

> We can see the outcomes of all courses through AYDEP. Instructors tell us to study for the exams according to those outcomes. When we look at those outcomes and study them, indeed we have similar type of questions in the exam. (P14)

The Effects of the System on the Teaching Process and Practices

Regarding the effects of the system on the teaching process and practices, both instructors and pre-service teachers pointed out the ability of the system to ensure planning and to ensure easy access although there were some limiting aspects. Under the sub-theme of ensuring planning, instructors mentioned *student access to the flow of the topics, associating the course competencies with the program competencies and student access to objectives, outcomes and performances*. As the limiting aspects, instructors emphasized *the inflexibility regarding question types* and *internet connection problems*. Regarding ensuring easy access, instructors expressed their views on *accessing grades*. An example from instructors' views on the effects of the system on the teaching process and practices is given below:

> Actually, in a sense, the student is satisfied with this situation too, he/she can see what he will do study week, in this sense, he/she comes to class motivated. Of course, there are positive and negative feedback, it is important. In the simplest sense, the student comes to class next week knowing what we will study. I think this is important and useful. In general, as I said, the course process was more disciplined; let's not say more tolerated, but the process was much more disciplined. Indeed, it is a good way of ethically controlling both the educators and the students. (I5)

Regarding ensuring easy access, pre-service teachers pointed out *accessibility of grades, instant access to grades* and *tracking absenteeism*. Under the sub-theme of ensuring planning, pre-service teachers mentioned *having access to the flow of the subjects* and *speeding up the process*. Finally, pre-service teachers reported the *stress of taking exams electronic* and *inability to use the system without internet* as limiting aspects. An example of pre-service teachers' views on the system's effects on the teaching process and practices is given below:

> The teachers write the subjects beforehand. I can prepare for classes accordingly. It is good that way. I can see the days I was absent. I can see my grades more easily through the system. (P3)

Using the System for Exams and Assignments

Regarding the effects of the system on the evaluation process, the instructors expressed positive and negative views about the examination and homework assignment through the system. The pre-service teachers, on the other hand, expressed only positive views about taking the exams through the system. While the instructors had negative views regarding *problems that may arise due to the infrastructure, the inadequacy of the system for applied courses, the unfamiliarity of the system, and the limitations in writing questions according to outcomes the most; they stated the suitability of the system for multiple-choice exams* as a positive view. Regarding the positive aspects of assigning homework from the system, instructors stated that it was *effective, provided time independence and saved time, it had a feedback feature, it was easy to evaluate* and *contributed to environmental causes by using less paper*. Regarding the negative aspects of assigning homework from the system, they mentioned *the inadequacy of the system for the homework assignments in applied courses, difficulty in evaluation* and *internet access problems.* An example from instructors' views on the use of the system for exams and homework is presented below:

> Homework is very important. It provides the following, but prior practices also provided the same. What is this? online learning: One; You can upload at any time you want. So you don't necessarily have to upload during class time. This makes you freer. When I start collecting homework in class, something I do with the students, for example, in the classroom, you waste time. The students experience problems to be motivated for the class again. However, systems like AYDEP give you and the student a certain amount of time, they upload it to that system without you having to deal with it at all, and when you come to the classroom, you save time; you don't spend time on homework again in the class... (I2)

Regarding the examinations through the system, pre-service teachers expressed positive views: *its complementary nature to the lesson, ability to learn the grades immediately, applicability for multiple-choice exams, suitability for theoretical courses* and *tracking which subjects to study from the system*. Pre-service teachers' negative views about exam practices included the following: *unfamiliarity of the practice* and *insufficiency of the system for applied courses.* Regarding homework practice, pre-service teachers expressed positive views: *effective, technology-based, provides time independence, saves time* and *contributes to using less paper.* An example of pre-service teachers' views on the use of the system for exams and homework is given below:

> There is no waste of paper. There is no problem of not being able to find the teacher about homework either. They can see it through the system. (P1)

Using the System in other Lessons

The sub-themes of willingness and reluctance to use emerged from instructors' and pre-service teachers' views regarding the use of the system for other courses in the future. Regarding willingness, the instructors pointed to system features, such as *writing the outcomes, making the lesson more planned, providing communication, being based on technology, document sharing* and *its assessment-evaluation system*. Regarding reluctance, they justified their views by stating that *the system was not suitable for different exam types* and *that the exams had to be taken in a computer environment*. An example from instructors' views on the use of the system in other courses in the future is given below:

> Most importantly, something needs to be integrated into the system regarding applied and oral exams. That's the first point. I think there may be some drawbacks regarding security. For example, I think students enter their passwords on the computer while taking the joint exams. So, do students have the opportunity to change their passwords during the exam? ... (I3)

Regarding the willingness to use the system in other courses in the future, pre-service teachers cited the following: *taking the exams in the computer environment, easy access to lecture notes, providing communication, keeping up with technology, accessing their grades instantly* and *seeing the topics*. Regarding reluctance, they stated that they were not *used to the electronic exams* and *the system was not suitable for applied courses.* An example of pre-service teachers' views about the use of the system in other lessons in the future is given below:

> I think the system should be used in the future if the exams will be on paper. We can see the lecture notes in the system, but we can only see the notes that the teacher emphasized more and underlined on the slides. It is good in that respect. However, the system can continue if the exams are not on the screen but on paper, I think it's a good system. (P2)

Aspects that Need Improvement

Instructors and pre-service teachers emphasized the sub-themes, such as flexibility, adaptation support and some technical aspects regarding the aspects of the system that need improvement. Concerning adaptation support, instructors pointed out the issues of *increasing information about the use of the system, providing feedback* and *increasing communication between offices*. In terms of flexibility, they emphasized *the support for different types of exams* and *not limiting the teaching staff.* In terms of technical aspects, they highlighted the following: *student information system synchronization, development of system login security systems* and *development of mobile phone applications*. An example from instructors' views on the aspects of the required system improvements is given below:

> Actually, it can be more efficient as a mobile phone application. As I said, I cannot look at the questions; I cannot add questions, I can only say this. I am satisfied when I use it on the computer, I do not have a problem except for the points I mentioned, but the system can be developed more to use it on a mobile. (I5)

The pre-service teachers emphasized the following regarding the technical aspects of the system: the exam interface and technical problems that might occur during *the exam,* and *the availability of online or video lessons*. Concerning flexibility, they stated that *the feature to see the exam paper* and *the need to have options for different exam types.* In terms of adaptation support, the need for more information was emphasized. An example of pre-service teachers' views about the aspects of the system that needs to be improved is given below:

It would be better if we learned the lesson that day without coming to school if we explained it to our teacher via video, and if we listened comfortably at home. (P1)

Discussion, Conclusion and Recommendations

This study examined instructors' and pre-service teachers' views on the effectiveness of the learning management system AYDEP system. Research findings demonstrate that the AYDEP system was generally used by the instructors and pre-service teachers for the purposes of planning the lesson process, measurement-evaluation and communication. Similar to this result, a study conducted by Yıldız (2015) reported that instructors in three state universities used a learning management system developed for distance education for file sharing, messaging, as a course content module, adding resources and assignment purposes, respectively. In addition, the findings showed that nearly half of the instructors did not use the e-exam and forum modules. Another study conducted by Ates and Guyer (2016) demonstrated that most of the instructors used the learning management system for messaging, sharing announcements, adding resources and creating questions, but they never utilized the discussion groups in the system. However, a study conducted by Yıldız (2020) with university students concluded that students communicated more through social media rather than communicating through the learning management system. One of the main roles of learning management systems in higher education is to provide connections and interactions between students, teachers and content (Holmes & Prieto-Rodriguez, 2018).

Another result obtained in this research showed that the AYDEP system was appreciated by instructors and pre-service teachers for providing independence from time and space, its ease of measurement and evaluation, its ability to informing students about the objectives and its support for the teaching process. A study conducted by Erdogdu and Sahin (2018) found that the learning management system used by pre-service teachers provided effective use of time. Holmes and Prieto-Rodriguez's (2018) study reported stated that staff and students enjoyed the ease of access to course materials at any time thanks to their learning management systems, and this situation provided flexibility for individuals. The availability of mobile applications of learning management systems and the ability to use them over the internet provide significant advantages for learning to take place regardless of space and time.

This research also noted some findings regarding the undesirable aspects of the AYDEP system. According to these findings, users pointed to some technical problems, system compatibility problems and some other limiting problems. The technical problems experienced by users were problems related to the interface problems and problems in uploading assignments. In their research, Erdogdu and Sahin (2018) reported that users experienced some technical problems with internet or with devices, such as telephones while using learning management systems. However, it was also stated that such problems could be solved easily and would not disrupt the learning process to a great extent.

Participants' views in this research demonstrated that they applied two different strategies in solving problems. The first strategy included receiving support from technical staff while the second strategy consisted of using their methods to solve problems. A study conducted by Koc and Turan (2014) reported that The Mobile Information System of Sakarya University did not display average grades and that the course materials could not be downloaded was regarded as a technical deficiency. Ates and Guyer's study (2016) mentioned that faculty members had to deal with excessive processing steps (interface problems) and experienced some technical problems while performing a function in the learning management system they used. The research results of Emiroglu (2009) are similar to the results of this research, reporting some problems experienced by instructors regarding uploading assignments and the structure of the site, as well as some issues regarding the system loading speed, Turkish language support, content filtering and labeling issues, and the badge system. A continuous and smooth operation of learning management systems is critical for users to adopt the system (Elcicek &Bahceci, 2017). Thus, identifying the problems encountered in the use of learning management systems and ensuring that they are effectively solved will positively affect the sound management of the education process.

It was concluded that making the course planned and organized, providing an interdisciplinary perspective and providing time-space independence were the most effective features of the system, which positively contributed to the achievement of the goals and outcomes of courses. Liu and Hwang (2010) stated in their research that ubiquitous learning is provided thanks to the use of mobile devices and the internet in e-learning systems. The study conducted by Erdogdu and Sahin (2018) with pre-service teachers emphasized that the learning management system provided convenience concerning usability and instant access to information and thus supported learning everywhere.

Another important result of this study indicated that the AYDEP system was welcomed regarding provision of planning, supporting communication and ensuring easy access, but it also had some restrictive aspects. A previous study conducted by Olpak and Ozcakir (2018) on the AYDEP system determined that pre-service teachers had a positive view of the system due to the convenience it provided and enrichment of the learning environment. The study conducted by Elmas (2013) on the Sakarya University Online Academic System, a kind of learning management system, reported that such systems strengthened the management of universities and increased their performances.

This research reported views on the positive and negative effects of AYDEP learning management system on the evaluation process. While efficiency and saving time regarding assignments were regarded as positive aspects, the findings showed that the system may be insufficient to assign homework applied lessons. In addition, while emphasizing the suitability of the system for multiple-choice exams, it was stated that it might be insufficient for the exams required for applied courses. User opinions regarding the widespread use of the system were generally positive. In particular, reasons, such as planning the lesson, writing the outcomes, and easy access to the lecture notes, were stated as positive reasons for the system to become more common. However, it was also reported that the system was unsuitable for different exam types and created anxiety on those who were unfamiliar with electronic exams. The study conducted by Yenipazar and Turan (2017) on the Information System of Sakarya University determined that students and staff had positive thoughts about the system. Erdogdu and Sahin (2018) reported that a similar learning management system was found to be useful by pre-service teachers. The study conducted by Olpak and Ozcakir (2018) stated that the pre-service teachers' level of satisfaction with the AYDEP system was above average and they found the system usable.

Research findings revealed that the system has features that can be improved. Accordingly, the AYDEP system needs improvement regarding flexibility, adaptation support and technical aspects. In the context of technical improvement needs of the system, the development of the security system in logging to the system was reported as a deficiency. Similarly, the study conducted by Bozkurt and Ucar (2018) reported that the percentage of undecided individuals was high regarding the feelings of trust for identity verification methods in the electronic systems for learning purposes. In addition, the participants stated that information-based authentication and biometric methods were more reliable. The research of Bozkurt and Ucar (2018) addressed mostly related to the exams taken by the students located in different places. During the period when this research was conducted, electronic exams were held in classroom environments in the AYDEP system in the presence of supervisors. For this reason, login security was provided with simpler methods. Ates and Guyer (2016) mentioned instructors' need to use their personal preferences in learning management systems. Yıldız (2020) concluded that lack of information provided to individuals who would use such systems reduced their motivation and desire to join the system. Ozonur et al. (2019) stated that providing more documents was among the aspects that needed to be developed for learning management systems.

It is believed that the results of this study will beneficial in the teacher training process for the users and practitioners of the learning management system. The most important feature that distinguishes AYDEP learning management system from the others is its focus on competency-based training. It is thought that the quality of teacher training will increase thanks to competency-based learning and outcomes-based assessment. Infrastructure problems should be solved, consultancy support should be provided and users should be trained on the system in order for users to achieve better efficiency and effectiveness.

This research was conducted in the Department of Classroom Education, Faculty of Education, affiliated with a state university. Similar studies can be conducted in different departments or even in different faculties. In addition, this research is limited to the views of instructors and pre-service teachers. Taking administrators' views will enable us to look at the effects of the system on education from different angles. Qualitative method was used in this study. Different studies can be conducted using quantitative or mixed methods, and also empirical studies can investigate the effects of learning management systems on educational outcomes.

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A Curriculum Alignment Analysis: A Sample of Life Sciences Course Curriculum (2018) for 3rd-Grade Students*

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Abstract. In this study, the analytical research design is used to conduct a curriculum alignment analysis on the Life Sciences Course Curriculum (LSCC) for 3rd-grade according to Revised Bloom's Taxonomy (RBT). Objective elements were sampled from LSCC. Class instructional activities and assessment questions were taken from the Life Sciences course book for 3rd-grade students, published by Evren Publishing and approved by the Board of Education and Discipline. In this research, 29 cognitive objectives were studied in addition to 134 instructional activities and 90 assessment questions relating to those cognitive objectives. These elements were analyzed by two researchers and using RBT matrix. The findings showed that among the objectives, instructional activities and assessment questions in LSCC, there were nine objectives with complete alignment, 17 objectives in partial alignment and three objectives with misalignment.

Keywords: Curriculum alignment analysis, revised Bloom's taxonomy, life sciences course curriculum

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Introduction

Life sciences is a primary school lesson aiming at a multifaceted child development with acquisition of basic information, skills and values on social and natural sciences through a concept of integrated education to create good human beings and citizens (Gultekin, 2015; Saglam, 2015). The goal of Life Sciences Course Curriculum (LSCC) is to bring up individuals who have the life skills, who are self-aware, who live safely and healthily, who embrace the values of their community, who are environmentally conscious, who are questioning and producing and who love their country (Ministry of National Education [MoNE], 2018).

It is necessary to keep curriculum elements in harmony with each other so that LSCC can meet the goals. Objectives are the elements that should be selected as a baseline (Biggs, 2003). Learning experiences that are not in line with the objectives may not provide the desired behavioral changes in the students. Assessments lacking this quality may not provide proper feedback either to the students or teachers for the objectives on behavioral development.

It is possible to find out the consistency between the elements of a curriculum with curriculum alignment analysis. Curriculum alignment refers to a clear consistency among targeted objectives and course content to attain these objectives, learning activities, learning strategies and assessment (Harvey and Baumann, 2012). Studying such consistency can provide feedback on the applicability and efficiency of the curriculum (Bumen, 2006; Erden, 1998), and it helps observe and assess what the students have learned (Martone & Sireci, 2009) as well as opinions to carry out more efficient and more sufficient learning process (Gorin & Blanchard, 2004).

Various taxonomies can be used in curriculum alignment analysis. The original Bloom's taxonomy (OBT) is one of them (Blook, 1956). However, OBT has been revised as it includes behavioral structure, strict hierarchal classifications, one-dimensional structure and incapacity to respond to such approaches as constructivism (Anderson et al., 2001; Bekdemir & Selim, 2008; Bumen, 2006; Huitt, 2009; Kreitzer & Madaus, 1994; Marzano, 2000; Zimmerman & Schunk, 2003). Revised Bloom's Taxonomy (RBT) and its sub-dimensions (Krathwohl, 2002, pp. 214-215) are presented in Table 1.

Revised Bloom's Taxonomy (RBT) is made up of two separate dimensions known as "knowledge and cognitive process". Knowledge dimension includes four types of knowledge, such as factual, conceptual, procedural, and metacognitive. Cognitive process dimension consists of such six skills as "remember, understand, apply, analyze, evaluate, and create" (Akin and Abaci, 2011; Nasstrom, 2008; Nasstrom, 2008; Pintrich, 2004). In Turkish literature, these are mainly used in their noun forms; however, it is more accurate to use these expressions in such verb forms as "remember, understand, apply, analyze, evaluate and create" since they describe student behavior (Krathwohl, 2002). "Remember, understand and apply" are considered as basic level cognitive process skills, and "analyze, evaluate and create" are regarded as high-level cognitive process skills (Crowe, Dirks, & Wenderoth, 2008; Zoller, 1993).

Table 1.

RBT and its sub-dimensions

Knowledge Dimension	Cognitive Process Dimension
A. Factual Knowledge: The basic elements students must know to be acquainted with a discipline or solve problems. A.a. Knowledge of terminology A.b. Knowledge of specific details and elements **B. Conceptual Knowledge:** The interrelationships among the basic elements within a larger structure that enable them to function together. B.a. Knowledge of classifications and categories B.b. Knowledge of principles and generalizations B.c. Knowledge of theories, models, and structures **C. Procedural Knowledge:** How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods. C.a. Knowledge of subject-specific skills and algorithms C.b. Knowledge of subject-specific techniques and methods C.c. Knowledge of criteria for determining when to use appropriate procedures **D. Metacognitive Knowledge:** Knowledge of cognition in general, as well as awareness and knowledge of one's own cognition D.a. Strategic knowledge D.b. Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge D.c. Self-knowledge	**1. Remember:** Retrieve relevant knowledge from long-term memory. 1.1. Recognize 1.2. Recall **2. Understand:** Construct meaning from instructional messages, including oral, written and graphic communication. 2.1. Interpret 2.2. Exemplify 2.3. Classify 2.4. Summarize 2.5. Infer 2.6. Compare 2.7. Explain **3. Apply:** Carry out or use a procedure in a given situation. 3.1. Execute 3.2. Implement **4. Analyze:** Break material into its constituent parts and determine how the parts relate to-one another and to an overall structure or purpose 4.1. Differentiate 4.2. Organize 4.3. Attribute **5. Evaluate:** Make judgments based on criteria and standards. 5.1. Check 5.2. Critique **6. Create:** Put elements together to form a coherent whole; reorganize into a new pattern or structure. 6.1. Generate 6.2. Plan 6.3. Produce

Source: Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into practice, 41*(4), 212-218. https://doi.org/10.1207/s15430421tip4104_2

RBT ensures clarification for OBT during the curriculum development process as it puts forward what to do with the curriculum elements in both knowledge and cognitive dimensions. Besides, it also puts a firm stamp on the relationship between the objective and the assessment (Paziotopoulos & Kroll, 2004; Bennett, 2001; Holmes, 2002; Oliver, Dobele, Greber, & Roberts, 2004), between the objective and learning experience (Airasian & Miranda, 2002) and between the learning experience and assessment elements when compared to OBT (Anderson, 2002). As a result, RBT can offer more than OBT while making a curriculum alignment analysis.

While conducting a curriculum alignment analysis based on an RBT, an RBT matrix, as seen in Table 2 is used. Every single curriculum element that needs to be studied is placed within the cell in which the horizontal and vertical dimensions intersect. During the placement, cognitive process dimension is selected for the verb in the target sentence and the knowledge dimension is selected for the nouns or noun clauses in the target sentence (Krathwohl, 2002). A ***curriculum alignment analysis*** clarifying the consistencies and inconsistencies in the curriculum is formed when all objectives, instructional activities and assessment elements for the curriculum are shown on the same table.

Table 2.

RBT Matrix

	COGNITIVE PROCESS DIMENSION					
KNOWLEDGE DIMENSION	Remember (1)	Understand (2)	Apply (3)	Analyze (4)	Evaluate (5)	Create (6)
Factual knowledge (a)	a1	a2	a3	a4	a5	a6
Conceptual knowledge (b)	b1	b2	b3	b4	b5	b6
Procedural knowledge (c)	c1	c2	c3	c4	c5	c6
Metacognitive knowledge (d)	d1	d2	d3	d4	d5	d6

In curriculum alignment analysis, objectives and instructional activities relating to these objectives (and supplementary materials) and assessment questions (e.g., performance assessments and test materials) are placed in proper cells. Later, matrices obtained from an analysis on objective, instructional activity and assessments are compared. Finally, an alignment table made up of relevant instructional activities and assessment questions are prepared for every objective. A complete alignment is formed when the objective, instructional activity and assessment elements intersect within the same cell; partial alignment occurs when the two intersects within the same cell; and when there is no intersection between the elements in any cell, it is interpreted as misalignment (Anderson, 2002; Bumen, 2006).

Complete alignment is the desirable status for the curriculums. Curriculum elements in complete alignment do not need to be modified or improved. However, the element or elements causing inconsistency must be revised properly in partial alignment so that curriculum deserves to be tried (Anderson, 2002). Curriculum's validity and efficiency are in question when a misalignment is observed (Airasian & Miranda, 2002). Hence, alignment analyses on relevant curriculums are needed to ensure the validity and efficiency of the curriculum. Therefore, LSCC is one of the curriculums that can be analysed within that scope.

In the literature, there are several studies on the overall structure and individual elements of 2018 LSCC (Aktay & Cetin, 2019; Eker, Bilgin, & Baykan, 2019; Ekmen & Demir, 2019; Esemen & Sadioglu, 2019; Gozel & Dincer, 2021; Karacaoglu, 2020; Karasu Avci & Ketenoglu Kayabasi, 2018; Yuksel & Taneri, 2020). However, these studies do not include the relations between the curriculum elements. Therefore, this study will contribute to the literature with its analysis of the mutual relations between the elements of 2018 LSCC. Such a curriculum alignment analysis is estimated to suggest an idea on the applicability and efficiency of LSCC. Thus, it is assumed to contribute to LSCC improvement studies. Therefore, this research aims to carry out a curriculum alignment analysis on LSCC (2018) for 3rd-grade. Within this scope, the analysis aims at finding answers to the following questions:

1. What is the level of curriculum alignment among the objectives, instructional activities, and assessments for 3rd-grade LSCC (2018)?
2. What is the RBT-based distribution of objectives, instructional activities and assessment questions in 3rd-grade LSCC?

Method

Design

In this study, analytic research design was used in this research to carry out RBT-based curriculum alignment analysis on LSCC. A document sampled in the analytical research can be analyzed based on the themes set within the frameworks of various notions, cases, facts, opinions, and situations (McMillan, 2004; cited. Ersoy, 2015). In this research, LSCC and Life Sciences coursebook were studied as individual documents and an analysis carried out was based on situational themes relating to curriculum alignment (complete alignment, partial alignment and misalignment).

Data Source and Selection

In this research, a curriculum alignment analysis of LSCC was carried out according to RBT and it was limited to 3rd-grade cognitive objectives. The reason why this research was limited to cognitive objectives was that RBT was intended for the cognitive areas. Curriculum objectives, instructional activities and assessment elements relevant to the curriculum objective are all needed to conduct a curriculum alignment analysis. 3rd-grade objectives in LSCC are accessible via LSCC (MoNE, 2018) published by the Board of Education and Discipline. However, LSCC does not include instructional activities and assessment elements for such objectives. These elements are included in the Life Sciences coursebook for 3rd-grade students, published by Evren Publishing (Karabiyik, 2019), which was also digitally accessible through EIN (Educational Information Network) at the time of research. Therefore, two individual documents- LSCC and Life Sciences coursebook for 3rd-grade students were studied in this research. LSCC was studied for 29 cognitive objectives in 3rd-grade level. In Life Sciences coursebook for 3rd-grade students, 134 instructional activities and 90 assessment questions in relation to these objectives are analyzed. Instructional activities include unit warm-up questions and reinforcement exercises in the “Let’s Reinforce” section present at the last pages of every unit. Assessment questions were made up of the exercises in “Let’s Evaluate” section at the final page of every unit. The unit of Healthy Life was not included in this analysis as its objectives are rather affective.

Data Analysis

Cognitive objectives in LSCC for 3rd grade, relevant instructional activities and assessment questions were analyzed by two researchers using the RBT matrix (Table 2). Since objectives were the essentials, during the analysis, all the objectives and relevant instructional activities and assessment questions were simultaneously placed into the table so that a potential ambiguity in any element was compensated by consulting to other elements. While analyzing the curriculum elements, the researchers individually encoded five objectives, 20 instructional activities and 20 assessment questions in the unit of "Life at School" in LSCC. Later on, they reunited to evaluate the analysis to discuss their point of view and disagreements so that a consensus can be reached. The remaining objectives, instructional activities and assessment questions were independently encoded and placed on the RBT matrix. After the encoding process, the inter-rater reliability was 99,60% (252/253) based on the formula "number of agreements/(number of agreements + disagreements)". As this reliability percentage is larger than 70%, encoding is considered reliable (Miles & Huberman, 1994). The researchers had a disagreement on instructional activity 1 of title "Let's Reinforce" on page 107 of the Life Sciences coursebook, and the content is shown below:

Konuyu Pekiştirelim

1. "Acil durum" deyince aklınıza gelenleri yazarak aşağıda verilen zihin haritasını tamamlayınız.

Let's Reinforce

1. Complete the mind map after brainstorming on "emergencies".

Since this is about every individual's own learning, both researchers placed this instructional activity in metacognitive subdimension (d) as RBT information dimension. However, one researcher stated that the learners only recall the information in this instructional activity and based his argument on the word "brainstorming"; hence he particularly placed this instructional activity into "remember" (1) subdimension, namely (d1), in a cognitive process dimension. The other researcher stated that the learners link the concepts scattered across their minds with the structure for the state of "emergency" and thus claimed this instructional activity into "understand" (2) subdimension, namely (d2). The researchers consulted a third researcher with published work on RBT and by a large majority, they agreed that the instructional activity belongs to the (d2) cell. Except for this sample, there has not been any disagreement. Below is an example of how the curriculum alignment analysis is performed over an objective analyzed with one accord.

In 3rd-grade LSCC, the 5th objective in the "Safe Life" unit (LS.3.4.5) is *"He/she knows what to do and whom to ask for help when there is someone posing a threat"*. This objective included the knowledge of the relationship between the basic elements of a wide structure in the knowledge dimension so that the elements could work together. In cognitive process dimension, it required inference skills based on the relationship between the pieces of information. Therefore, it was placed as conceptual knowledge (b) in the subdimension of knowledge and as "explain" (2) in the subdimension of the cognitive process – hence (b2). The following activities were based on this objective.

Activity 1: A stranger asked to give you a lift home while you were getting back home from school. How must you respond to such a situation? Explain (b2)
Activity 2: What must you do when you meet someone posing a threat to your safety? (b2)
Activity 3: A stranger suggests taking you to an amusement park. Write what you must do under the conditions. (b2)
Activity 4: Ozan was late for school. He was supposed to be at school before his teacher went into the classroom. On his way home, a car approached him.
Stranger: I can see you are late. Get in the car, so I can take you to school fast.
• What would be a proper answer Ozan should give in such a case? Explain. (b2).
Activity 5: Write down what Ozan needs to do later. (b3)

(The fourth and the fifth instructional activities were given as a single instructional activity on the coursebook. However, they were individually analysed as their content differs from one another.) All the instructional activities were evaluated within the subdimension of conceptual knowledge (b) for the relevant LS.3.4.5 objective. In the cognitive process dimension, the first, second, third and fourth instructional activities were included in the subdimension of "understand" (2) as they included inference, explanation, and deduction from written messages and the fifth instructional activity was included in the subdimension of "apply (3)" as it required practice and performance.

Assessment questions on the same objective are presented below:

Assessment question 1: (a1)
Write whether the statements below are true (T) or false (F).
( ) We should accept help from strangers on our way to school.
Assessment question 2: (a1)

Hangi çocuğun kartındaki yazı, T.C. Aile, Çalışma ve Sosyal Hizmetler Bakanlığının okul çağındaki çocuklar için belirlediği kurallardan değildir?

Which of these students does not have a card with a rule set by the Turkish Ministry of Family, Labor and Social Services?

A. Crying out for help in difficult situations
B. Not going to deserted streets, construction areas and abandoned places
C. Opening the door for strangers while alone at home

Assessment question 3: (b2)

Görsele göre Mert, tanımadığı bu kişiye aşağıdaki cevaplardan hangisini vermelidir?

A. Çikolatayı alamam, sizinle de gelemem.
B. Teşekkür ederim. En çok sevdiğim çikolata.
C. Peki, sizinle gelirim ama çikolatayı alamam.

Your father told me to give you this chocolate. Come with me.

According to the image, how should Mert respond to this stranger?

A. I can neither take this chocolate nor ride with you.

B. Thank you. It is my favorite chocolate.

C. Ok, I'll come with you, but I cannot take this chocolate.

In terms of knowledge dimension, the first and the second assessment questions included factual knowledge (a) as they assess basic knowledge on the relevant unit and the third assessment question included conceptual knowledge (b). Concerning cognitive process dimension, the first and the second questions were based on recognition and remembrance, so it was in the subdimension of "remember" (1); and the third questions was in the subdimension of "understand" (2) as it required explanation.

Table 3 shows a curriculum alignment analysis on the 5th objective (LS.3.4.5) of the 3rd-grade LSCC Safe Life unit as well as the relevant instructional activities (ia1, ia2, ia3, ia4, ia5) and three assessment questions (aq1, aq2, aq3).

Table 3.

Curriculum Alignment Sample

Objective		Instructional activity		Assessment		Alignment type	Interpretation
Element	Cell	Element	Cell	Element	Cell		
LS.3.4.5.	B2	ia1	B2	aq1	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia1	B2	aq2	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia1	B2	aq3	B2	Complete	Three elements aligned
LS.3.4.5.	B2	ia2	B2	aq1	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia2	B2	aq2	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia2	B2	aq3	B2	Complete	Three elements aligned
LS.3.4.5.	B2	ia3	B2	aq1	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia3	B2	aq2	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia3	B2	aq3	B2	Complete	Three elements aligned
LS.3.4.5.	B2	ia4	B2	aq1	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia4	B2	aq2	A1	Partial	Two elements aligned
LS.3.4.5.	B2	ia4	B2	aq3	B2	Complete	Three elements aligned
LS.3.4.5.	B2	ia5	B3	aq1	A1	Misalignment	Three elements misaligned
LS.3.4.5.	B2	ia5	B3	aq2	A1	Misalignment	Three elements misaligned
LS.3.4.5.	B2	ia5	B3	aq3	B2	Partial	Two elements aligned

The sample pointed to a complete alignment among the first, second, third, fourth instructional activities (ia1) and the first assessment question (aq1) for LS.3.4.5 objective. Due to the availability of at least one state with complete alignment, this objective was expressed as "complete alignment". Other alignment analyses on LS.3.4.5 were not included in this evaluation concerning the alignment type of the objective.

Findings

The distribution of curriculum alignment level among such elements as objective, instructional activity, and assessment in 3rd-grade LSCC are studied, and the findings are presented in Table 4.

Table 4.

Curriculum Alignment Level among such Elements as Objective, Instructional Activity and Assessment in 3rd-grade LSCC

	LaS	LaH	SL	LiOC	LiN	Total
Complete alignment	1	2	3	2	1	9
Partial alignment	4	3	2	4	4	17
Misalignment		1	1	1		3

LaS: Life at School, LaH: Life at Home, SL: Safe Life, LiOC: Life in Our Country, LiN: Life in Nature

As shown in Table 4, there are nine objectives with complete alignment among objectives, instructional activities, and assessment questions, 17 objectives with partial alignment and three objectives with misalignment. This means that LSCC is mainly consisted of relationships with partial alignments. The number of complete alignments is relatively lower than partial alignments. In LSCC, there are relatively a small number of misalignments.

Table 5 shows the findings on the distribution of 29 cognitive objectives, 134 instructional activities and 90 assessment questions included in 3rd-grade LSCC based on the units according to RBT.

Table 5.

An RBT-Based Analysis of Objectives, Instructional Activities and Assessment Questions in 3rd-Grade LSCC

		a1	a2	a3	a6	b2	b3	b4	b6	c1	c2	c3	d2
Objectives	LaS			1		1			1			2	
	LaH					4			1			1	
	SL		1			5							
	LiOC	2	1	2			1	1					
	LiN			1		3						1	
Instructional Activities	LaS	3		1		9		1	2		1	3	
	LaH	2				27			3		2	2	
	SL	3				16	1	2	1				1
	LiOC	6		8	1	12	1	2	1				
	LiN	4		2		10			1		1	5	
Assessment Questions	LaS	14			1	3				1	1		
	LaH	10				3							
	SL	13				5							
	LiOC	15				5							
	LiN	18				1							

LaS: Life at School, LaH: Life at Home, SL: Safe Life, LiOC: Life in Our Country, LiN: Life in Nature

As shown in Table 5, it was seen that the objectives were intensified in the subdimensions of "conceptual (b) and factual (a) knowledge" and that there was none in the subdimension of "metacognitive knowledge (d)". In the cognitive process dimension, the objectives were mostly available for the “understand (2)” subdimension and that there was none in the subdimension of “analyze (4)”. The concentration of objectives was dense in “understand conceptual knowledge (b2)”, “apply factual knowledge (a3), and “apply procedural knowledge (c3)”. Overall, it was observed that the objectives aiming at a high level of cognitive process skills were limited.

It was seen that the instructional activities in the 3rd-grade Life Sciences coursebook were mostly for “conceptual knowledge (b)” subdimension and “metacognitive knowledge (d)” subdimension had the least. In cognitive process dimension, instructional activities were mostly present in “understand (2)” subdimension and there is none in the “evaluate (5)” subdimension. Instructional activities were mainly intense in “understand conceptual knowledge (b2)” and “remember factual knowledge (a1)”. Concerning cognitive process skills, the most repeated subdimension was “understand (2)”, followed by “apply (3)”. It was observed that the number of instructional activities for high level cognitive skills was limited.

An analysis of the distribution of assessment questions revealed that there was a considerable portion of assessment questions in the “factual knowledge (a)” subdimension in terms of knowledge dimensions, yet there was none in “metacognitive knowledge (d)” subdimension. Most of the assessment questions are present in “remember (1)”; and there was none in subdimensions of “apply (3), analyze (4), evaluate (5) and create (6)”. In general, the majority of assessment questions were found in “remember factual knowledge (a1)” and “understand conceptual knowledge (b2)”.

Discussion, Result and Suggestions

Since curriculums require systematic integrity, all curriculum elements need to be consistent with one another to achieve the overall objective (Tyler, 1969). To study the consistency between the curriculum elements, it is suggested to analyze curriculum elements both individually and collectively (Erden, 1998). It is thought that such an analysis will give an opinion for the applicability of the curriculum to the practitioners, curriculum developers as well as other partners in the curriculum. The alignment among the elements of LSCC has been analyzed in this study based on RBT and curriculum elements have also been studied individually for an accurate interpretation of the analysis.

Findings suggest that LSCC does not truly project a complete alignment and that the relationship among the relevant curriculum elements is rather made up of partial alignments. This points out an inconsistency between any two elements of the curriculum, such as the objective, an instructional activity, and assessment. Such inconsistency may make LSCC challenging to apply. Concerning partial alignments, one may fail to form learning experiences relevant to the objectives if the objective and assessments are consistent with one another, yet the instructional activities are inconsistent with them. As a result, the learning process maynot be carried out effective and efficiently. There is also the possibility of making inaccurate detections about the targeted learning product and the learning process at times of partial alignments in which objective and instructional activities are consistent and the assessment is inconsistent; which may consequently lead to challenges to achieve LSCC objectives (Bumen, 2006; Erden, 1998). Despite these unfavorable possibilities, it can be said that LSCC is a revisable curriculum since there is a certain level of complete alignment consistency and the number of misalignments is low and partial alignments is high. Once partial and misalignments are revised, the curriculum can be transformed into a more consistent, more efficient and more applicable curriculum. To transform partial alignments to complete alignments, instructional activities, or assessment questions inconsistent with the objectives might be modified for greater consistency. In the case of misalignments, both learning activities and assessment questions can be reviewed to make them consistent with the objectives and, therefore, with each other. Otherwise, it may lead to the formation of wrong ideas regarding learning type, learning experience and learner evaluation, which will be inaccurate, incomplete and will not project the student level properly.

When LSCC elements are individually studied, objectives are mostly found in the subdimension of "conceptual knowledge," and there is none in the subdimension of "metacognitive knowledge". In the cognitive process dimensions, most of the objectives are found in the subdimension of "understand" and there is none found in the subdimension of "analyze". As to the analysis on such distinctive goals in LSCC as "The student becomes familiar with himself/herself and his/her surroundings" and "He/she acquires the skills of the basic scientific process"; it is seen that these goals encompass "conceptual knowledge" defined as the knowledge of the relationship between the basic elements within a greater structure. Therefore, it can be said that the intensity of "conceptual knowledge" is meaningful in terms of achieving these goals in LSCC. However, as to the goal of "The student acquires a skill to learn how to learn", there is no metacognitive objective found in LSCC. As the subdimension of "metacognitive knowledge" is not as tangible as the other types of knowledge (Nasstrom, 2008), it is relatively more difficult to develop instructional activities and to make assessments and write objectives. Hence, it is a considerable drawback for LSCC not to have any objective representing this dimension even though the scarcity of objectives related to metacognitive learning is tolerable. The objectives of LSCC are expected to include metacognitive knowledge as well as it is prepared with a constructivist approach (Dunlop & Grabinger, 1996). Surely, such a design suggestion might be questionable as to whether it is acceptable to expect metacognitive objectives from 3rd-grade students. However, it can be said that the suggestion makes more sense after considering that children have metacognitive skills as of early childhood and they can think upon their own mental states (Schneider & Loffler, 2016; Whitebread & Neale, 2020), and they are familiar with their own learning processes as of the first grade and they are capable of resorting to various mental processes in relation to understand as of the second grade (Annevirta & Vauras, 2001).

When the objectives are studied based on the subdimension of "analyze, evaluate and create" (Zoller, 1993) known as the high-level cognitive process skills in the cognitive process dimension of RBT, it is seen that a mere three of 29 objectives can be utilized within this scope. From this point of view, it is possible to put forward that 3rd-grade LSCC in 2018 concentrates on basic cognitive process skills and objectives for high-level cognitive process skills are not represented enough in the curriculum. A literature review reveals that other curriculum analyses carried out in primary school (Aktan, 2020; Aslan & Atik, 2018; Buyukalan Filiz & Baysal, 2019; Canguven, Oz, Binzet, & Avci, 2017; Durmus, 2017; Karip, 2019; Yolcu, 2019) are like LSCC within that respect. Although this finding is consistent with the literature review, a LSCC based on constructivist approach is supposed to support the learning of high-level cognitive process skills (Biggs, 1996; Driscoll, 1994). Like metacognitive knowledge, it is necessary to discuss whether high-level cognitive process skills should be included for the 1st, 2nd, and 3rd-grade primary school students expected to be in the concrete operational stage. Lewis and Smity (1993) claim that advanced thinking is necessary for everyone since every individual -even the ungifted children- may face various situations in their daily life that are confusing or in which they have to make decisions on what to do or what to believe. Considering that life sciences course deals with the situations related to school, family, health, security, country, and nature, it seems important that children should acquire high-level cognitive skills.

A study on curriculum elements reveals that instructional activities have the highest density among all elements. Regarding the RBT knowledge dimension, it can be said that most of these instructional activities are seen in the subdimension of “conceptual knowledge,” and the least is seen in the subdimension of “metacognitive knowledge”. In cognitive process dimension, instructional activities concentrate most in the subdimension of “understand” and it is seen that there is no instructional activity in the subdimension of “analyze”. This finding is consistent with the findings on the analysis of LSCC objectives. The fact that instructional activities focused most on the subdimension of “understand” followed by the subdimension of “apply” is not consistent with the distribution of cognitive process dimensions in the objectives. However, given that it is natural for instructional activities to include more practices, this might be considered “tolerable” so long as it does not distort curriculum alignment. As to high-level cognitive skills, it is seen that a limited number of instructional activities requires such skills. This indicates that LSCC does not aim at high-level cognitive skills either in objectives or in instructional activities.

When assessment questions are studied for the RBT knowledge dimension, it is seen that a great majority of assessment questions are included in the subdimension of “factual knowledge”, yet there is none in the subdimension of “metacognitive knowledge”. In the cognitive process dimension, the questions are mostly in the subdimension of “remember” and there is no assessment question in the subdimensions of “apply”, “analyze”, and “evaluate”. It is uncovered that assessment questions concentrate most on “remember factual knowledge (a1) as followed by “understand conceptual knowledge (b2)”. “Factual knowledge” and the basic cognitive process skill “remember” are for the more complicated learning process (Mayer, 2002). However, given that most of the questions aim at “remember factual knowledge (a1)” might lead students to memorize rather than understanding (Anderson et al., 2001). The assessment questions in “a1” and “b2" account for almost all assessment questions; therefore, it might be assumed that these questions are not enough to measure the student’s different knowledge and high-level cognitive skills which are aimed to be developed by the constructive approach. In 2018 LSCC, objectives and instructional activities mainly requiring an understanding of conceptual knowledge are being tested mostly through the assessment questions aiming at remembering factual knowledge. As a result, the assessment element hinders the way to a complete alignment. Overall, it can be said that assessment element in life sciences should not be used as an element to create pressure on students (Baysal, Tezcan, & Arac, 2018). However, this does not mean that assessments to be made may lack the ability to measure objectives. Even if it is not used as a tool of pressure and grade, assessments in life sciences course are expected to provide feedback on the students’ cognitive and affective behaviors.

A summary of research findings reveals five basic results. First, the complete alignment ratio of LSCC is not in the desired level; however, its partial alignment ratio is also high. The desired level in this course is to see that every single element of the curriculum has an alignment with the other relevant elements, without any exception. As suggested by Anderson (2002), this means that the barrier between consistencies of the curriculum elements is removed so that the curriculum is considered applicable. Second, assessment questions are the elements breaking the alignment in LSCC. Assessment questions try to test even the objectives and instructional activities that do not require very advanced level cognitive skills at lower levels. Thirdly, the distributions of objectives, instructional activities, and assessment questions vary concerning both knowledge and cognitive process. Assessment questions concentrate more on “remember factual knowledge”, which might be interpreted as the questions are “insufficient” to test the objectives and instructional activities. The fourth result is that all three curriculum elements fail to represent metacognitive knowledge and high-level cognitive process skills. The fifth result is that there are quantitatively more instructional activities than objectives and assessment questions, which is consistent with the process-based nature of the curriculum.

Based on these research findings, curriculum development experts and publishing houses might be advised to revise the objectives, instructional activities, and assessment questions in 3rd-grade LSCC and coursebook so that the curriculum elements are consistent with one another to form a complete alignment in terms of knowledge and cognitive process dimensions. In line with constructive theory, they might be advised to include “procedural and metacognitive knowledge” in the dimension of knowledge, such high-level cognitive process skills as “analyze, evaluate, and create” in the dimension of the cognitive process while revising curriculum elements. Teachers - the practitioners of the curriculum- can be advised to be informed on RBT so that they can determine the instructional activities for the objective levels and prepare proper assessment questions. Teachers making use of LSCC as it is maybe advised to consider instructional activities more aligned with the objectives and assessment questions so that they can use a processed-based assessment method to test whether the students achieve the objectives.

This research is limited to 3rd-grade life sciences course. For additional contribution to the literature, LSCC can be analyzed for its curriculum alignments in different grades or analyses on other course curriculums might be carried out. In this research, curriculum alignment analysis has been carried out only through studying official curriculum and all the elements studied are available via the official curriculum. For further research, while objectives are sampled from the official curriculum, instructional activities and assessment approaches can be sampled from in-class instructional activities within the framework of the operational curriculum. This could provide valuable insights into the literature as the curriculum alignment between the theory and the practice might be determined.

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A Common Language among Child, School and Parents: The Use of Pedagogical Documentation in the Parent Involvement Process*

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Abstract: This study aims to examine the role of pedagogical documentation as a part of the school-parent collaboration from the perspectives of parents. In this study, which was conducted with the phenomenological design, data were collected using semi-structured interviews from 27 parents. The findings of the inductive analyzes were gathered under the themes of the visibility of learning, the parent-school bridge, and the child-parent-teacher collaboration. In line with the perceptions and experiences of parents, the findings showed that the pedagogical documentation increases the awareness of parents about their child's learning experiences at school, interactions, and reflections on these, provides guidance about parenting, improves the interaction between child and parents, supports the development of the child and learning at home, and contributes to school-parent collaboration. Given the contribution of parent involvement on child development and learning, it is believed that the findings obtained in this study will contribute to teachers, policymakers, and program developers in terms of utilizing pedagogical documentation as a tool for school-home collaboration.

Keywords: Pedagogical documentation, school-parent collaboration, parent involvement, early childhood education

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Introduction

School, society, and parents are crucial stakeholders in the child's development and learning process. The role of collaboration between these stakeholders in supporting the development and learning of the child from an early age is widely known in the literature (Clifford & Goncu, 2019; Comer & Haynes, 1991; Einarsdottir & Gardarsdottir, 2009; Epstein, 1995, 2001; McWayne, Hampton, Fantuzzo, Cohen & Sekino, 2004). Children spend most of their day at home and school; this reveals the significance of the relationship between school and home, and thus, the value of parent involvement (Hakyemez, 2015; Henderson et al., 2007; Ward, 2009). The quality of collaboration with parents affects the education life of children both in early childhood and in later years (Barnes, Guin, Allen; & Jolly, 2016; Ihmeideh & Oliemat, 2015; McIntyre, Eckert, Fiese, Reed & Wildenger, 2010). The context of the relationship with parents, school, culture and society from an early age should be critically examined while educating young children. Therefore, it is important for teachers to collaborate with parents while planning learning environments to support interaction.

The significance of parent involvement and communication for early childhood education learning environments has been emphasized with various studies (Bayraktar, Guven, & Temel 2016; Demircan, 2018; Desforges & Abouchaar, 2003; Epstein, 2001, 2010; Toran & Ozgen, 2019). Despite the common acknowledgment of the benefits emphasized in studies on the involvement of parents in the education processes of their children, there are significant gaps between parent involvement practices highlighted in the literature and parent involvement practices in schools (Hornby, 2011). Various activities, such as providing voluntary aid for the children in the classroom, breakfast meetings, trips and show and tell activities, are organized for communication with parents at schools. However, it is crucial for parent involvement to highlight an effective partnership, such as effective parent-teacher meetings and two-way communication between schools and parents in addition to such activities (Grant & Ray, 2010; Hornby, 2011). Relationship between home and school should include dialogues that will improve the learning and development process of the child; in addition to this point of view, there is a need for practices beyond parent seminars and meetings held several times a year (Henderson et al., 2007; LaRocque, Kleiman & Darling, 2011).

Various theoretical frameworks, especially in the international literature, were suggested to indicate the nature of parent involvement with its various aspects. Within the scope of the model of Weiss, Caspe and Lopez (2006), parent involvement was evaluated under three topics: parenting, home-school relationships and responsibility for learning outcomes. Similarly, Grolnick and Slowiaczek (1994) explain parent involvement under three topics as parent involvement in school activities (behavior), providing learning opportunities for the child at home (cognitive/intellectual), and following closely what the child does at school and what he/she learns (personal). In another model developed by Hoover-Dempsey and Sandler (1997), it has been emphasized that there are three different variables that determine the level of parent involvement in their children's learning. These variables are listed as the belief that parent involvement in the learning experiences of their children is part of their responsibilities, the invitations and demands for involvement submitted to the parents by schools and teachers, and the demands for time and energy that may contradict the involvement activities of the families (Hoover-Dempsey & Sandler 1997). Another model that is frequently emphasized in the literature for family-school cooperation is the classification developed by Epstein (1995). In this model, the collaboration between parents and school is conceptualized as six types of involvement: parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community. If explained a little more in detail, these can be listed as follows: developing skills of parents in parenting and organizing a home environment that will support children as learners; establishing two-way communication channels between school and home; organizing programs to enable parents to voluntarily monitor the school performance of their children; providing parents with information and ideas on how to help their children at home; ensuring that parents are involved in school decisions as contributors; and developing a shared responsibility for children with the community to strengthen school programs (Epstein, 1995).

In Turkey, the need for practices to improve and develop parent involvement was stated in various reports (Education Reform Initiative [ERI], 2016; Mother-Child Education Foundation [MCEF], 2017). Within the scope of these improvement practices, the need to increase the quality of information flow and the quality of sharing information between parents and school was also emphasized (ERI, 2016). Studies examining family-school interaction in Turkey mostly focuses on parent involvement (Atakan, 2010; Gursimsek, 2010; Kotaman, 2008; Koksal-Egmez, 2008; Unuvar, 2010). From the perspective of parents, it can be seen that parents consider the critical role of parent involvement in their child’s learning (Tezel-Sahin et al., 2011). According to the results of the study conducted by Atakan (2010), parent involvement activities include parents coming to the classroom for various events and planning out-of-school activities such as parent education conferences, activities at home, field trips with parents. In another study (Ozkan Yildiz & Yilmaz 2020), the parent involvement in the assessment process of their children was examined, and it was found that parents were tended to use face-to-face communication in this process and that they wanted to learn about the social-emotional development of children to prepare their children for primary school. In their study, Gunay Bilaloglu and Aktas Arnas (2019) have reported that parents do not know how to support their children's learning, and for that, parents state that they need the guidance of teachers.

Pedagogical Documentation and Parent Involvement

Pedagogical documentation, which is practiced in various countries and especially emphasized by the Reggio Emilia approach, has become an important tool for schools to establish relationships and develop collaboration with parents (Edwards et al., 1998). Pedagogical documentation is a continuous, process-oriented learning, teaching and assessment method that includes keeping the records of interactions and learning experiences of children within their learning environment with their peers, teachers and parents, adding teacher's assessment in these records, analyzing these records and sharing the records through documentation tools (Buldu, 2010; Dahlberg, Moss & Pence, 2007; Rinaldi, 2001). In the pedagogical documentation process, teachers collect evidence of children's learning experiences. While recording children's interactions, teachers use multiple tools through systematic observation and active listening (Buldu, 2010; MacDonald, 2007). Photographs captured from recorded observations, children's expressions and outputs and analysis of teachers are shared with parents through documentation tools (panel, portfolio, newsletter). In this context, pedagogical documentation provides opportunities to collaborate and communicate with parents (Carr, 2001; Katz & Chard, 1996; Lewin-Benham, 2006; Rinaldi, 1998). As a result of the visibility provided by the documentation tools, parents become more aware of the development and learning processes of their children and they may support these processes at home (Dahlberg et al., 2007; Gandini, 1993; Rinaldi, 1998, 2006). Through this awareness, parents observe their children's development, follow the learning and teaching activities at school, and support their children's development and learning by sharing their observations they made at home about their children with teachers (Carr, 2001; Katz & Chard, 1996). It has been stated in recent studies that pedagogical documentation is being used for effective communication and partnership between home and school (Alasuutari, Markstrom, & Roth, 2014; Buldu, 2010; Hostyn et al., 2020; McLean, 2019; Reynolds & Duff, 2016). Brown-Dupaul et al. (2001) describe documentation panels as "a unique way to highlight classroom learning" and state that "teachers can use them to communicate with families about a myriad of concepts and issues" (p. 209).

Pedagogical documentation is a process that strengthens the bond between school and home for parents as well as for teachers (Buldu, 2010; Grieshaber & Hatch, 2003; Picchio, Giandomenico, & Musatti, 2014). “Visibility, legibility and shareability” provided by documentation tools (Rinaldi, 2006, p. 69) make the learning process and classroom experiences visible to parents. When the literature is reviewed, it can be seen that very few studies (e.g., Birbili & Tzioga, 2014; MacDonald, 2007; McLean, 2019; Reynolds & Duff, 2016; Rintakorpi et al., 2014) have examined the role of pedagogical documentation on parent involvement and school-parent collaboration. In these studies, it has been emphasized that parents participate in the assessment processes of their children as a result of the pedagogical documentation (Birbili & Tzioga, 2014) and that parents can communicate more with their children about their learning experiences with the help of documentation tools (Reynolds & Duff, 2016). McLean (2019) conducted questionnaires with 45 parents on the views of parents about pedagogical documentation and collected data from seven parents through interviews, before and after the documentation process. According to the findings of the study, the views of the parents are as follows: pedagogical documentation raises parents' awareness of how their children learn and spend time in school; through documentation, the communication among the child, the parents and the teacher is being established, and the involvement of child and parents in school is also being supported. In this context, new studies are required to determine the implications of documentation on different environments and cultures. Especially in Turkey, where pedagogical documentation practices are merely new, studies with different sample groups are needed. The purpose of this study is to reveal the perceptions and experiences of families who have encountered pedagogical documentation practices for the first time, about how pedagogical documentation contributes to the collaboration between school and home, which is under-researched. Thus, this study aims to contribute to the literature. In this study, the parent involvement model of Weiss, Caspe and Lopez (2006), Epstein (2006), and Grolnick and Slowiaczek (1994) was used as a conceptual framework with an eclectic approach. The concepts of parenting, communication, learning at home used in these models were also used as a framework in this study to examine the relationship between pedagogical documentation and parent involvement.

In this regard, this study aims to examine pedagogical documentation as a part of school-parent cooperation and as a means of sharing information, in line with family perceptions and experiences. Research questions were as follows:

- What are the perceptions of parents about the use of pedagogical documentation to improve parent involvement and school-parent collaboration?
- What are the experiences of parents regarding the implementation of pedagogical documentation?

Method

Research Design

This study was conducted as part of a larger scaled research project and as qualitative phenomenology research. According to Merriam (2013), the purpose of phenomenology research is "to understand how people make sense of their lives and their experiences" (p. 23). On the other hand, Creswell and Poth (2018) described phenomenology research as the researcher's description of the experiences in a way that everyone can understand by collecting data from individuals who have experienced the phenomenon. In line with these definitions, this study aims to examine the experiences of parents regarding the pedagogical documentation and reveal perceptions on teacher-parent interaction and collaboration established through pedagogical documentation. The pedagogical documentation project was carried out in nine different early childhood education institutions in Ankara, including two private kindergartens, three non-affiliated public kindergartens, three kindergartens affiliated to an institution, and one public preschool, 24 teachers, 231 children and their parents took part in this research project. Purposeful sampling was used, 27 volunteers among 231 parents participated (Patton, 1990) to collect rich data in this study. Participants were selected to represent eight different schools to ensure maximum variety and the study group consisted of families whose children continue their education in schools where pedagogical documentation implementations were carried out within the scope of the project mentioned above. During the period of this study, the children of 10 parents were attending private kindergartens, while the children of 17 parents were attending public schools. There were 26 mothers and one father among the parents who directly interacted with pedagogical documentation tools and volunteered for this study.

Data Collection Tools and Procedure

Within the scope of the pedagogical documentation project, pedagogical documentation implementations were carried out by teachers in their learning environments during the spring semester of 2014-2015. Documentation panels, bulletins and portfolios were prepared by teachers as a means of sharing information, which makes children's learning experiences visible and makes them possible to be shared. Documentation panels consisted of photographs reflecting children’s learning experiences and interactions, children’s expressions and teachers’ comments, as well as products and drawings of children. Bulletins were published in monthly periods; they were prepared with content that includes informative news about the practices taking place in the learning environments as well as information about the plan of the next month. Portfolios were specifically prepared for each child; they were prepared using multiple and various observation and recording tools to reflect holistic development and learning processes of the child for one semester. Documentation panels were prepared weekly or biweekly, bulletins were sent to families every month, and portfolios were prepared for each child and shared with parents at the end of each semester. In this study, which examines the perceptions and experiences of parents on pedagogical documentation, the data were collected using semi-structured interviews conducted at the end of the spring semester. Interview is a means for participants to present their ideas, opinions, perceptions, and experiences about a topic (Saldana, 2011); it is also accepted as a form of communication in which the researcher tries to obtain detailed descriptions and interpretations about the lives of individuals (Fontana & Frey, 2000). Eleven questions were asked to the parents within the scope of the interviews. Some of the questions asked in the interviews are as follows: "Could you give information about your sharing with your child’s teacher regarding your child's experiences at school?", "What are your general thoughts about the pedagogical documentation used in your child's school/classroom?", "Could you give information about your sharing with your child regarding your child's experiences at school?" The semi-structured interview forms used in this study were prepared by the researchers during the project preparation phase, presented for expert opinions, and approved by the ethics committee. Volunteer parents were contacted through teachers. The interviews were conducted in indoor and quiet places suitable for the interviews in schools where the children of parents attend, and audio or video recordings were used during the interviews. The interviews lasted 271 minutes and the interviews were transcribed as a text of 140 pages with double spacing between lines.

During this project, teachers were trained by the project team on pedagogical documentation processes, tools and learning environments. Classrooms were observed and teachers were supported in their practice in the fall and spring semesters of 2014-2015. The project team was also involved in other interactions at schools to make observations periodically, inform families about the project process, answer their questions and communicate with families during portfolio sharing days. In this way, the researchers who conducted the interviews had been present at schools for a long time and established a reliable relationship with the stakeholders within the school environment.

The data were collected after the informed consent of the parents were obtained within the scope of the Ethics Committee approval (B.30.2.TED.0.12.00/30) and the implementation permit (2013/70297673/100/167068) of the Ministry of National Education General Directorate of Basic Education. The identities of the parents participating in this study were made anonymous and coded with the numbers given to teachers and parents to present the findings. For example, the first family that volunteered from the class of the 18th participant teacher was coded as T18-P1.

Data Analysis

In this study, the inductive approach was used to analyze the data obtained from semi-structured interviews conducted with parents. Merriam (2013) emphasizes that qualitative data analysis is inductive and comparative. Therefore, in this study, while creating inductive categories, descriptive coding and axial coding processes suggested by Saldana (2013) were used and data analysis was carried out in two stages. In the descriptive coding process, the subject in the text is expressed with one or more words. In axial coding, which is the second step of the coding process, categories and subcategories are associated with each other and each category's framework was defined. Before starting the coding process, the records of the interviews in which the families shared their experiences and perceptions about pedagogical documentation were transcribed verbatim and a text of analysis was created. In the first stage of the data coding process, this text was read separately by each researcher, and the process of creating the descriptive codes was carried out separately by each one of them. Later, in the second stage, the coders met via the panel system, reviewed the codes together, reached a consensus on conflicted coding and made rearrangements.

Quality of the Study

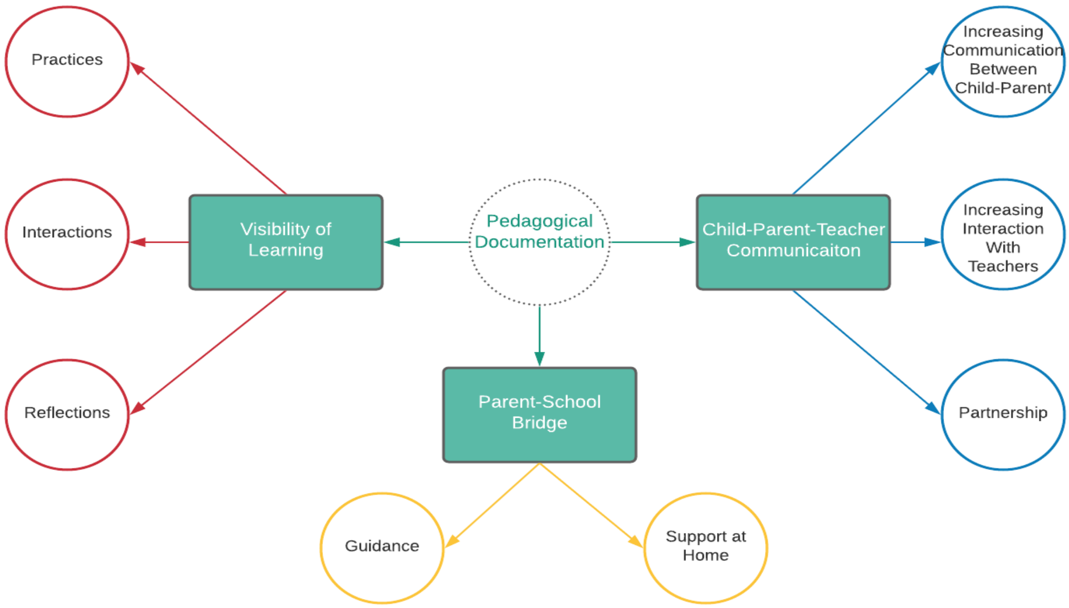
Various methods are used within the literature for the validity and reliability of data in qualitative research (Creswell, 2009; Lincoln & Guba, 1985; Whittemore et al., 2001). Regarding the data, interpretations and methods used to define the quality of this study, the four tenets of credibility, dependability, confirmability and transferability suggested by Lincoln and Guba (1985) were followed. Credibility is to establish the trust that the results are true and credible. In this context, for the first tenet, during the data collection process, the researchers communicated and interacted at schools through long-lasting observations and interviews. In addition, researchers frequently met to discuss the research process and exchanged views with each other. Another essential step for credibility is the validity and reliability of the data collection tool; the interview forms were evaluated by two early childhood education experts and the content of the interview forms was finalized in accordance with their feedback. Dependability includes the steps followed to replicate the findings of the qualitative study in the same context. In this study, certain protocols were used in interviews to achieve this, and informative documents were prepared for all stages of this study. The confirmability of a study is to establish the trust that the results of this study will also be supported by other studies. At this point, the triangulation strategy was used in both data collection and data analysis processes. Several researchers were involved in the data analysis process and shared codes were created. In addition, given that more than one researcher taking part in the data collection process of the research was another aspect of researcher triangulation. For the transferability of this study -in a broader sense for the results that were transferred to other contexts or settings- detailed information was introduced to the reader using rich descriptions during the presentation of the data obtained from families.

Findings

The present study aims to investigate the perceptions and experiences of parents, who have encountered pedagogical documentation practices for the first time, about how pedagogical documentation contributes to the collaboration between school and family. The findings of this study showed that pedagogical documentation contributed positively to the involvement of parents in learning and teaching processes and that parents had positive experiences. The results of the analysis were gathered under three main themes. These were the visibility of learning, the parent-school bridge and the child-parent-teacher collaboration. The themes and the categories related to each theme are shown in Figure 1.

Figure 1.

Themes and Related Categories



Visibility of Learning

The first notable finding concerning the contribution of the pedagogical documentation processes to the parents participating in this study is the increase in visibility of education activities through the pedagogical documentation process and the awareness of parents about school activities. Table 1 shows sample excerpts of perceptions and experiences related to the theme of visibility of learning.

Documentation tools were the most important output that provided visibility to all stakeholders of the pedagogical documentation applied in classrooms. One of the parents, who stated that children's learning was visible as a result of the panels, portfolios and bulletins within the scope of pedagogical documentation practices, expressed this situation as follows: “But as I said, when we came to school to take them home, thanks to our boards (panels), we always knew what they were painting that day and what materials they used.” (T12-P1) One parent expressed her experience with bulletins, one of the pedagogical documentation tools as follows: “At least, there are weekly bulletins. Our teacher writes about what my child is doing for the week, day by day. We get the chance to follow what our child is doing, the way it is now much better." (T13-P1) As one of the pedagogical documentation tools, portfolios are important in terms of visibility of development and learning, and they provide families with information about their children. Panels and bulletins were documentation tools that were shared with families periodically, while portfolios were shared with families at the end of each semester on organized portfolio sharing days. Parents emphasized that portfolios provided the opportunity to see how much children developed over a period of time. Regarding the portfolios, one parent said: "We did not have such a folder last year. Thanks to this folder, I can see every aspect of my son now." (T20-P1)

Table 1.

Categories and Excerpts of Parents related to the Theme of Visibility of Learning

Theme	Category	Parent Excerpts
Visibility of Learning	Practices	"They took photos of each picture made by the children in the classroom and what was done within the scope of this project, and they recorded them on video. We looked at them; for example, they start with very simple things at first and obtain information from children. They asked what is this, what do you think it could be, or where to go from here?... With this project, we can see what the children are doing and how their progress is." (T18-P2)
	Interactions	"I especially liked the bulletin among all the works done. Because although we are in contact with the school and the teacher of my child, I think it is still a very good idea to see in written form what the teachers and children are doing together. I really liked seeing the relationship between my child and his/her friends, what my child is doing in the classroom, and the feedback." (T3-P1)
	Reflections	"We read the feedback and asked questions to our child with my spouse, 'What does that mean? Look, you did that; you never told us." Then, our child started to tell us about it, got excited, jumped up and there, showed us something and so on. It was really good. Otherwise, we don't even know, our child had learned something two weeks ago and we saw it here." (T21-P1)

Parents stated that they were aware of the interactions within learning environments, and the photographs and dialogues regarding the communication of their children with other stakeholders, through the documentation tools. Parents also expressed their experiences with different documentation tools, as well as their perceptions and experiences, including the photos, statements and comments of their children in these tools. Documentation tools enabled children to reflect their experiences in the school context to their homes. Participants drew attention to the significance of these expressions in terms of seeing what meanings their children attributed to what they did in the school context

The findings of the interviews indicated that the documentation tools, which were an important part of the pedagogical documentation process, provided parents with the opportunity to monitor and follow up on the experiences of their children within the classroom. Parents emphasized the importance of documentation panels, bulletins and portfolios in this process. They stated that the tools and the rich content, which reflected the process, were beneficial.

Parent-School Bridge

According to the findings, the pedagogical documentation provided information to parents about what their children do at school, gave them the opportunity to have an idea about what kinds of activities their children participated in and how they participated and provided guidance for parents about what to do to support their children at home. Table 2 shows sample excerpts of perceptions and experiences related to this theme.

Table 2.

Categories and Excerpts of Parents related to the Theme of Parent-School Bridge

Theme	Category	Parent Excerpts
Parent-School Bridge	Guidance	"To come here, to participate in parent involvement activities, things that are sent to us by teachers... All, of course, has been guiding us to be a better parent as well." (T21-P1) "Those training or documentation we receive can be a guide for all of us." (T18-P1)
	Support at Home	“It contributed to me very much. And it made me realize some other things as well. Because I can see exactly what they are doing at school. My child is not talkative. If I ask, "What did you do at school today?", the answer will probably be "You know, some stuff." But thanks to the weekly bulletins, daily programs shared by our teacher, I can see what my child is doing; therefore, I am able to think about what more I can contribute to my child on this or that issue." (T15-P2)

According to the statements of the participants, creating a bridge between schools and parents through panels, monthly bulletins sent to parents, portfolios reflecting the development and learning process of children at the end of each semester created a foundation to guide parents in understanding their children and to support what had been learned at school at home. While explaining the contribution of the documentation process to parent involvement in the development and learning activities of their children, one parent stated: “It also contributed to us; as we knew what they were doing about which topics at school, so we were able to support them in those topics. Because sometimes you have to do something parallel with your children." (T4-P2)

The statements of the parents who participated in this study suggested that the increased visibility as a result of the pedagogical documentation process and tools also contributed to the awareness of parents of their children. One parent expressed this situation as follows: "I think it helped me understand my child better." (T8-P1) Pedagogical documentation served as a bridge for parents to exchange information about what was learned at school, and this exchange had a positive effect on time spent with children. Documentation tools were used in all classrooms to establish communication between home and school. These tools enabled parents to have an idea of the teacher's expectations and efforts for their children.

The documentation process supported the flow of information from the teacher to the parents about the learning outcomes and development processes of the children. The documentation became a means for the teacher to encourage parents to support their children within the home environment. As a result, it can be seen that the link between learning activities in the classroom and learning activities at home was effectively established.

Child-Parent-Teacher Collaboration

Parents stated that their interaction and communication with their children were taking place in a healthier, closer and more effective manner, that their interaction with teachers increased, and that partnership between school and family was developed as a result of the pedagogical documentation process. Table 3 shows the excerpts of parents related to this theme.

Findings obtained from parents indicated that the interactions, the sharing and communication of parents with their children had increased. Accordingly, the parents stated that they shared more about what the children were doing at home and school. One parent said: "I can explain this with the bulletin; my child was very happy to show me what he/she did. My child was very happy to explain it at length, page after page... told all these while having a lot of fun, and I liked it very much." (T3-P1)

Findings obtained from the interviews showed that pedagogical documentation increased parent-teacher interactions, which have a critical role in the preschool period, and enabled these interactions to be more effective concerning content. The parents stated that they engaged in more interaction with the teachers regarding the educational activities carried out at school and the learning and development of their children. One parent said the following: "(...) it is nice to see what our children are interested in and what they have done all week. Therefore, I think it is successful in terms of teacher-parent relationship (...)." (T4-P1)

Table 3.

Categories and Excerpts of Parents related to the Theme of Child-Parent-Teacher Cooperation

Theme	Category	Parent Excerpts
Child-Parent-Teacher Collaboration	Increase in Communication between Child and Parent	"They started to talk more, to tell and share more..." (T22-P2) "Things are happening concerning close contact, for example, I can say that my child shares what they do at school, wants to do the things that (he/she) could not do at school in this way, I can say that we established a closer communication (...) Let's do this; my friends have done the following activity, I was not there, and so forth... I can say that we have increased involvement a little more now." (T2-P1)
Child-Parent-Teacher Collaboration	Increase in Interaction with the Teacher	"It positively affected our relationship with the teacher of our child. We share a lot about [my child]. We meet very often. We constantly talk to each other about the development of my child." (T16-P1) "Of course, we had more dialogue with the teacher." (T7-P1)
	Partnership	"We have always found solutions with the teacher." (T18-P1) "Yes, because I think it strengthens the relationship between the school, my son and me; between the three of us." (T3-P1)

The findings of this study also highlighted that with the pedagogical documentation process, partnership between school and home/family had been developed. Parents drew attention to the partnership they had developed with the school on issues, such as supporting the children and problem solving, as well as teacher-parent interaction. One parent expressed this situation as follows: "We are able to discuss and solve the problems of our child related to the classroom and private life with our teacher privately." (T15-P2) One of the parents described the contribution of pedagogical documentation to the partnership between school and family: "A common language has been formed between the parent, the student [child] and the school." (T20-P1)

When the expressions of the parents were examined, it was that the interaction of parents with their children increased based on what their children learned, how they developed, and what were their interests, skills and needs. In addition, parents emphasized the changes in their dialogues with teachers and stated that their sharing about the learning and development processes of their children increased. Expressions of the participating parents support the developing partnership between parents and teachers through documentation tools. Findings suggest that pedagogical documentation contributes to the development of child-parent-teacher collaboration.

Discussion

This study, focusing on the experiences and perceptions of parents whose children attend where pedagogical documentation practices take place, revealed that families see pedagogical documentation as a tool that makes learning visible, nurtures the bridge between the family and the school and supports the interaction between child-teacher-family. In this context, experiences and perceptions of the participant parents are in line with the earlier studies in the literature on pedagogical documentation (Buldu, 2010; Reynolds & Duff, 2016; Mclean, 2019). When the findings of the study are examined concerning the expressions of the parents who have encountered pedagogical documentation implementations for the first time, the visibility provided by the documentation should be evaluated as a significant issue that is required to be researched within the context of family. In addition, if this study is evaluated in terms of parent involvement models introduced by the researchers, such as Epstein (1995), Grolnick and Slowiaczek (1994), Weiss, Caspe and Lopez (2006), the findings of this study support the claim that parent involvement is improved through the pedagogical documentation process, especially in the themes of parenting, child-family communication, support for the development and learning at home, and school-family cooperation.

Earlier literature shows that interaction and communication between family and children increased with the documentation tools (Buldu, 2010; Gunes, 2018; Kline, 2008). Documentation practices enable families to speak and share more with their children. Parents become more aware of the perspective, thoughts, and existing potentials of their children through the pedagogical documentation implementation and tools; parents build a deeper understanding of their children and respond better to their interests. According to Katz and Chard (1996), conversations between parent and child support the learning process of children. This study also supports that pedagogical documentation offers parents the opportunity to learn more about the learning activities of their children, and thus have the opportunity to talk and share with their children about their experiences at school. Fleck, Richmond, Sanderson and Yacovetta (2015) argue that conversations about learning experiences between mothers and children differ depending on whether there is a documentation tool in the environment or not; they conclude that the dialogues contain more detail in the presence of documentation tools, and the more open-ended questions mothers ask, the more children contribute in the dialogue. Similarly, Reynolds and Duff (2016) emphasize that pedagogical documentation tools encourage parents to start conversations that enable them to establish a deeper understanding of what their children are doing in the classroom. On the other hand, Kline (2008) states that documentation is a method that supports parents to have more information about the experiences of their children at school. The findings of this study are in line with the findings of the earlier studies within the international literature. Visible classroom processes contribute to the awareness of parents on the learning and development of their children.

Studies emphasize that both parents and teachers should be encouraged to work together and cooperate to support children in the short term and long term (Li et al., 2019; Knopf & Swick, 2008). The prevalence and effectiveness of parent-teacher interaction are closely related to the belief in the need and necessity for these two stakeholders towards each other. Pedagogical documentation practicing teachers and schools adopt a sharing process that supports this cooperation. The findings of this study also prove that the documentation tools provide a foundation that encourages parent-teacher cooperation. Kocher (2008) stated that while pedagogical documentation enabled teachers to have more information about children, it also enabled them to start working more closely with parents. Transparency provided by documentation tools allows parents to involve in their children's experiences at school. Moreover, parents understand how valuable their contribution to their children's education is, and they find the opportunity to become more aware of the various methods to support their children. The parents participating in the pedagogical documentation process understand the importance of the learning processes of their children better and undertake more responsibility in this regard (Kinney & Wharton, 2007). It allows parents involved in pedagogical documentation to more closely follow their children with the help of their teachers and allows involving more in the learning processes at school (Birbili & Tzioga, 2014).

Another notable finding of this study is that the interaction and sharing among the child-family-teacher increases as a result of the pedagogical documentation process. Similarly, Buldu (2010) concludes that the pedagogical documentation process increases the awareness of parents of the learning experiences of their children at school and also improves the dialogue among the parent-child-school. According to Unuvar's (2010) study in which she examined the views of parents and teachers on parent involvement comparatively, the practices of the teachers and the expectations of the parents do not match each other, efforts of teachers to involve parents in the children's learning processes remain only written on a paper, efforts of teachers are unnoticed by the parents, and teachers should be informed to ensure the visibility of parent involvement activities. The findings of this study, in line with the findings in Reynolds and Duff's (2016) study, show that the parents of the children are more involved in the process through the pedagogical documentation process. Pedagogical documentation provides a different perspective for parent involvement. It enables the parents to look at their role in the development and learning of their children from a different perspective. In the study examining the effects of pedagogical documentation on parent involvement in early childhood, Gunes (2018) states that after the pedagogical documentation process, parent involvement definitions of families have changed from coming to school and doing activities to more complex and elaborate definitions; and therefore, have diversified. As a result of the documentation process, visibility, openness to sharing and transparency increase. Thus, documentation also increases efficiency among stakeholders. More educational interactions are being made to support the development of the children.

In Turkey, communication with parents is limited to parent training/conferences, classroom events and field trips (Atakan, 2010; Abbak, 2008; Caltik, 2004). Considering the studies examining the effects of parent-child-teacher interaction on children's learning and development in early childhood, the quality of this interaction is significant (Arnold et al., 2008). Thus, it is necessary to establish dialogues with parents, especially on children's development and learning, to provide them with ideas about how to support their children at home, and support parents to have information about their children's thoughts and hypotheses. In line with the findings of this study, Gunes (2018) states that as a result of the pedagogical documentation tools, parents may detail information about what their children encounter during their learning process and have an idea of how they can support their children at home.

According to Epstein (1995), it is beneficial to maintain the communication and cooperation between parents and school in a continuous and mutual manner, based on the division of responsibilities; realizing this expands the sphere of parent involvement not only towards the school but also towards all environments that support the development and learning of children. Studies show that parents actually want to be a part of cooperation and a communicative relationship; they want to establish closer and effective relationships with teachers and to take part in the development and learning processes of their children at school (Swick, 2004; Ward, 2009). Supporting parent involvement and school-parent cooperation with long-term and extended applications, such as documentation, shows that the expectations of parents to involve more in education are also met. Similarly, according to some studies in the literature, parents cannot participate in parent involvement activities due to their busy working hours and lack of free time (Carlisle, Stanley, & Kemple, 2005; Gunay Bilaloglu & Aktas Arnas, 2019; Hornby & Blackwell, 2018; Kocyigit, 2015; Orcan Kacan, Kimzan, Guler Yildiz & Cagdas, 2019). In addition, teachers may encounter difficulties with communicating with parents privately and one by one due to time constraints (Ozkan Yildiz & Yilmaz, 2020). Documentation panels displayed on school and classroom panels periodically and the classroom bulletins sent to homes monthly may be used as one of the effective solutions for these problems.

Conclusion and Recommendations

This study examines the benefits of pedagogical documentation in terms of parent involvement, which is a new practice in Turkey. It is expected to contribute to the literature concerning the role of pedagogical documentation in increasing the cooperation between school and parents. Rinaldi (1998) states the contribution of participation for parents, child and school as follows:

"...schooling for us is a system of relations and communications embedded in the wider social system. Certainly one of our basic principles involves participation, in the broadest sense of the word. To feel of a sense of belonging, to be a part of a larger endeavor, to share meanings-these are the rights of everyone involved in the educational process, whether teachers, children, or parents" (p. 114).

In this context, as a result of this study, new perspectives and practices may be established for the parent involvement in the education process of their children and the communication between the teachers and the parents. Shared experiences through evidence-based and visual documentation tools support the mutual relationship between the schools and the parents. During the implementation, parent involvement activities that focus on the participation of parents in school activities may be interrupted due to reasons such as parents' inability to spare time and different expectations of the school and parents. Besides the parent involvement in school activities, classroom processes are made visible through documentation. Thus, parents can involve in the learning of their children at school. In this respect, the use of documentation tools that increases the interaction among the child, parent and teacher and offers an invitation for cooperation that may be used more commonly. Given the contributions of documentation to stakeholders, including pedagogical documentation practices as a way to support parent involvement, learning this topic in teacher training programs and increasing the variety of lessons on this subject can be an important opportunity to enable teachers to come to the field with better knowledge on this subject. Finally, considering the contribution of the parent involvement in the education process for children and their learning process mentioned in the studies in the literature (Epstein, 1995; Sheldon, 2003), we think that it is beneficial for education policy-makers and program developers to use the findings of this study.

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An Analysis of the Seventh-Grade Science Textbook in Terms of Science, Engineering, and Entrepreneurship Applications

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Abstract: The purpose of the present study is to analyse the secondary school 7th-grade science textbook in terms of science, engineering, and entrepreneurship applications, an area of practice emphasised in the curriculum restructured in 2018. For this purpose, the document analysis method, one of the qualitative research methods, was employed in the study. The research data source consists of 6 project design activities in the 7th-grade science textbook taught in the 2018-2019 academic year. The project design activities were analysed by content analysis. Analysis findings found coordination between the attainment of some curriculum units and the instructions in the textbook failed to be achieved. Deficiencies in terms of material, time, and cost according to science, engineering, and entrepreneurship evaluation criteria in the project design sections were also found. It was concluded that the link between the curriculum and textbook should be improved in some units following the science assessment criteria.

Keywords: Science, engineering, and entrepreneurship (SEE) applications, seventh-grade science textbook, project design

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Introduction

Our world has experienced changes and developments in many areas such as the economy, technology and education over time. In the future, this development and change will reach further dimensions than it is now (Yilmaz, 2016). Living in a dynamic world in the 21st century has led to changes in individuals hierarchy of needs. It has become necessary to make some changes in our education system to raise qualified individuals following the 21st-century hierarchy of needs (Cansoy, 2018). Creating an effective learning and teaching environment and raising individuals following the requirements of the age is one of the requirements of our education system (Sungur Gul & Marulcu, 2014). 21st-century skills began to manifest themselves under the name '21st Century hierarchy of needs' in the science curriculum, which was first revised in 2017 for this purpose. Differences in the scope of skills learning can be seen in the science curriculum renewed in 2017. In the 2017 science curriculum, the skill-learning areas under three main headings were specified as scientific process skills, life skills, and engineering design skills. In contrast, these skill areas were given under the title of 'field-specific skills in the science curriculum' revised in 2018.

The changes in skill areas the last two years are a few of the studies aimed at changing the skill areas of individuals. The new age demands from individuals are based on the logic of 'design, build, and market (DBM)'. Therefore, the practices in our education system should be directed to DBM. The first signs of DBM are seen in the 2018 science curriculum. In this context, Bahar, Yener, Yilmaz, Emen, and Gurer (2018) reported that the number of attainments and lesson hours determined for the units in the science curriculum in 2018 were shortened and that SEE applications constituted a large part of the period. Accordingly, it can be claimed that the importance of engineering and design skills increased in the science curriculum in 2018. SEE applications are a strategy adopted by the curriculum. Although this indicates that engineering is at the forefront of science education, it also shows that entrepreneurship has taken its place. The presence of engineering, which is also included in the 2018 science curriculum, reveals the importance of science and engineering, with the inclusion of engineering education in the science curriculum in the USA (Sungur Gul & Marulcu, 2014). Pre-service teachers, who are aware of the importance of science and engineering, state that engineering practices are important for science education (Marulcu & Sungur, 2013).

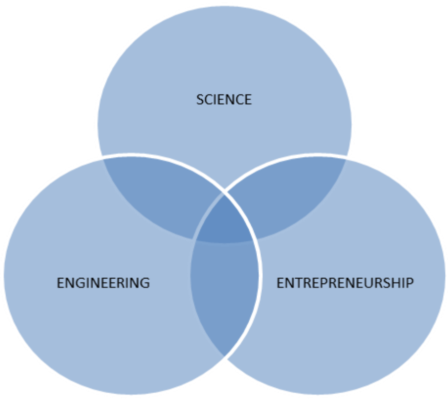
In terms of the contribution of engineering to science education, what engineering means should be defined first. Engineering includes the object that the individual wants to design in line with their wishes and needs, its design process, and applications that are systematic and open to progress (Ministry of National Education [MoNE], 2018). On the other hand, engineering problems provide our connection with life as predicted by our education system (Ercan & Sahin, 2015). In this respect, it is similar to the problem-based learning model used in science education. Similarities to the scientific problem-solving method were also mentioned by teachers (Sungur Gul & Marulcu, 2014).

Additionally, it was reported that engineering-based science education helps students develop many types of intelligence and skills, such as creativity, reflectivity, imagination, drawing, and scientific thinking (Marulcu & Sungur, 2013). The contribution of engineering to science education has made the creation of the 2018 science curriculum based on an innovative perspective based on science and engineering possible. Additionally, the concept of entrepreneurship, referred to as the marketing of the product obtained from the engineering design process (EDP), is also included in the 2018 science curriculum (Deveci, 2018).

It is important to develop students' marketing skills for the product they create following EDP to increase the competitive power of our country at the international level. To include entrepreneurial spirit among students' competencies, we need to know what is required from the students under entrepreneurship. MoNE (2018) emphasised that students should develop marketing strategies to introduce the products they designed to develop their entrepreneurship skills. They should benefit from promotional tools to achieve this.

Figure 1.

SEE Relations

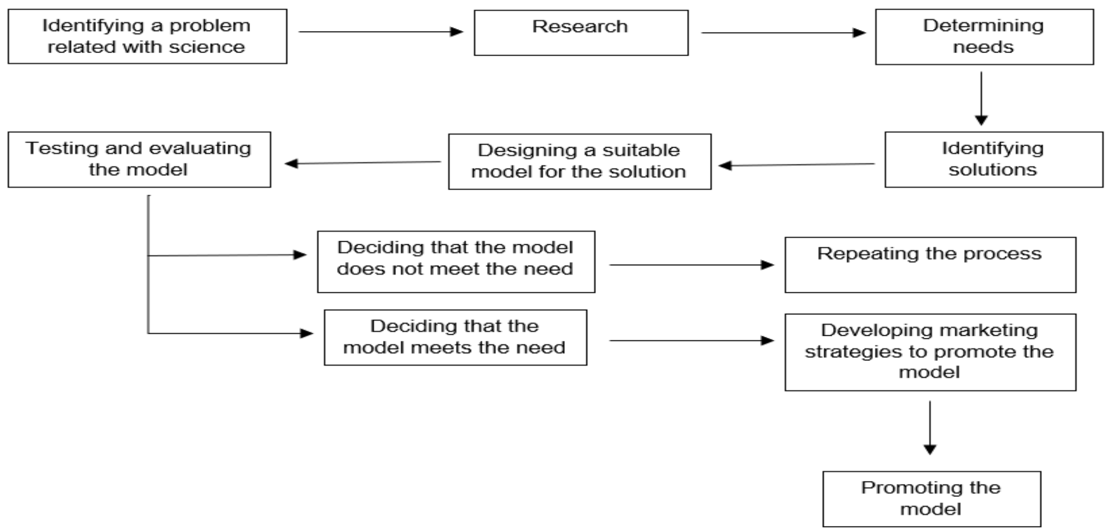


As presented in Figure 1 above, the SEE trio is presented as in the 2018 science curriculum. This relationship has been united under the name 'SEE applications' and covers students' education periods (Deveci, 2018).

Students need to experience these practices in science classes (MoNE, 2018) to increase the scientific and technological development capacity, socioeconomic development, and international competitiveness of our country within the scope of SEE practices. As a result of their engineering and entrepreneurship experiences in science classes, students can learn by actively completing the stages of designing and marketing a product. In this respect, it has a significant contribution to educating students following the requirements of the sectoral world.

Figure 2.

SEE Application Steps



As presented in Figure 2 above, students carry out the SEE applications in the science curriculum through stages. This process, which starts with determining a science-related problem, ends with introducing the model if the designed model meets the need. Students have the opportunity to introduce their model at the science festival at the end of the year (MoNE, 2018). Taken the scientific process steps and the EDP steps in the 7th-grade science textbook [written by Demirkazan, Kalik, and Ocal, (2018)], even if both contain common steps for students to create a product (model) as a result of EDP, it is essential to report the results of the data at the end of the steps (Koyunlu, Unlu, & Sen, 2018). Accordingly, science education aims to train future scientists by making students think, create a product (model), and promote this product (model) as scientists.

SEE practices have an important place in raising individuals suitable for the qualities of our age. These applications, which have a place in the science curriculum, should be included in textbooks that serve as guides for students and teachers. Textbooks approved by the MoNE should be in line with the objectives in the curriculum (Atici, Keskin Samanci, & Ozel, 2007). Science textbooks prepared following the attainments in the curriculum should help students learn with activities (Unsal & Gunes, 2003). Additionally, science textbooks organised according to students' levels (Ceger & Aydogdu, 2017) include activities that will attract students' attention and direct them to research and inquiry, which are advantages (Atici et al., 2007).

Some previous studies on science textbooks have reported that science textbooks improve students' understanding of scientific concepts (DeVore-Wedding, 2016; Guzzetti & Mardis, 2017; Lai & Chan, 2020; Lai & Wang, 2016; Romance & Vitale, 2012). Analysing textbooks (which are teaching tools for students and teachers) according to certain criteria to prepare them according to the requirements of our dynamic world will make it easier to eliminate existing deficiencies (Koyunlu Unlu & Sen, 2018). Therefore, presenting SEE applications in textbooks will contribute to researchers, teachers, and textbook writers. For these reasons, the purpose of the present study is to analyse the activities in the 7th-grade science textbook taught in the 2018-2019 academic year in terms of SEE applications.

Methodology

Research Model

The present study, which analysed the 7th-grade science textbook activities taught in the 2018-2019 academic year in terms of SEE applications, employed the document analysis method. The reason for utilising document analysis is that it includes the analysis of written sources from which data can be collected about the phenomenon (Yildirim & Simsek, 2018). Depending on the purpose of the research, written sources used may be books, journals, and articles (Ozdemir, 2015).

Document analysis, which is a qualitative research method (Christensen, Johnson & Turner, 2011/2015) and a qualitative study method (such as words, pictures, and images), the permission of access is often required to access the materials (Creswell, 2007); which is among the factors that limit document analysis. However, this limitation was eliminated in the present study because a Ministry of National Education approved textbook was used.

Data Source and Analysis

The 7th-grade science textbook activities taught in 2018-2019 were analysed by SEE applications in the present study. Content analysis was used to analyse the applications. Content analysis is conducted to determine certain concepts and words in the document sections to be examined (Buyukozturk, Kilic Cakmak, Akgun, Karadeniz, & Demirel, 2018).

In the 7th-grade science textbook content, there are various applications under the title ‘project design’ and activities. As presented in Table 1 below, the number of activities is 40, and the number of projects is 6 in the 7th-grade science textbook. While the activities create a learning environment where students will participate in the lesson and learn by completing activities, in the project design section, students are required to create projects by conducting applications that improve scientific process skills (Demirkazan et al., 2018). Therefore, there are applications in the project design section within the scope of SEE applications in the 7th-grade science textbook. Since the 7th-grade science textbook analysis in terms of SEE applications is the objective, the projects in the project design section were included in the research.

Table 1.

Number of Activities and Projects in the 7th-grade Science Textbook

Units	Number of Activities	Number of Projects
Solar System and Beyond	3	-
Cell and Divisions	4	1
Force and Energy	5	1
Pure Substances and Mixtures	8	2
The Interaction of Light with Matter	12	1
Reproduction, Growth and Development in Living Organisms	4	-
Electric circuits	4	1
Total	**40**	**6**

Six projects in the 7th-grade science textbook were analysed in line with the criteria determined by the researchers. These criteria were formed using the SEE application steps, and the opinions of two experts in the field were consulted to ensure validity. The steps in which three components were included in the assessment separately and the evaluation criteria prepared for SEE applications are presented in Table 2 below.

Table 2.

Evaluation Criteria for SEE Applications Determined by Researchers

SCIENCE	1) Is it effective in identifying a science-related need or problem? How? 2) Does the project design allow students to benefit from daily life? 3) Is it directly/indirectly related to unit attainments?
ENGINEERING	1) Does it encourage students to research? 2) Does it provide students with the ability to determine the need and solution path for the model to be designed/developed? 3) Does the project topic enable students to design a suitable model for the solution?
ENTREPRENEURSHIP	1) Does it provide the student with marketing strategies for introducing the model? How? 2) Does it offer the student a variety of alternatives for model promotion? How? 3) What skills does the student develop while introducing the model? 4) Does it enable the student to use media tools (such as the internet, newspaper, television) to promote and present the model?
SCIENCE, ENGINEERING AND ENTREPRENEURSHIP	1) Do the applications meet the student's goal of acquiring scientific knowledge? How? 2) Do the applications enable the student to establish a relationship between science and engineering? How? 3) Do the problem or need cover material, time, and cost criteria? In what way? How? 4) Can the student integrate scientific knowledge with engineering applications and turn it into a product at the end of the application? How? 5) Are there any explanations regarding the exhibition of the applications made at the end of the term and their presentation to the school stakeholders? How?

Within the scope of the investigation, a total of 6 projects: 1 from the "cell and divisions" unit, 1 from the "force and energy" unit, 2 from the "pure substance and mixtures" unit, 1 from the "interaction of light with matter" unit, and 1 from the "electrical circuits" unit have been analysed in line with the criteria presented in Table 2 above.

Credibility and Ethics

The study should also be taken in terms of validity and reliability to ensure credibility in qualitative research. One way to ensure reliability in a qualitative study is to provide detailed explanations of each path followed in the study (Buyukozturk et al., 2018). In the present study, all stages from data collection to the analysis process were explained and described in detail. Triangulation of the researcher was employed to increase the reliability of the data in the present study, so more than one researcher worked in the collection, analysis, and interpretation of the data.

In qualitative research, as data collection and interpretation are performed by researchers, the objectivity of the research may be disrupted. Detailed field notes can preserve the objectivity of the research (Buyukozturk et al., 2018). Field notes kept by the researchers and tables obtained from the textbook analysed provided the validity of the research.

Research ethics is a set of rules that guide the decision about researching within the framework of ethical rules. In a study in which ethical rules are followed, it is necessary to benefit from the work of others in the introduction, findings, and discussion sections (Christensen et al., 2011/2015). In this context, our research has been completed by considering research ethics. There are references to different studies in the present study.

Findings

The analyses of the project design sections in the 7th-grade science textbook taught in the 2018-2019 academic year are presented below.

The scientific process skills in the 7th-grade science textbook are presented in Figure-3, and the engineering design process in Figures 4, 5, 6, and 7. Based on these parts of the book, the projects were evaluated.

Figure 3.

Scientific Process Skills in the 7th-grade Science Textbook

SCIENTIFIC PROCESS SKILLS A scientific method is used in research projects, consisting of successive scientific steps and finding answers to the questions. When you follow the scientific method steps one by one, you will complete your project. The scientific method is a necessary tool to assist you throughout the project. In research and development projects, a model/tool that will solve a problem or do a job better is developed and tested. If you plan to conduct such projects, carefully read the instructions given under the heading "Research and Development Projects Design Process".
1. Find the Project Topic You can start your project by determining a topic you are interested in. While determining the topic, you should also determine the research questions. The following examples can be given for research questions: How does the heart work? Why do some birds migrate? Why are cars similar in form? Why do some trees shed their leaves in autumn while others don't? What is the reason for the zinc deficiency in plants grown in the Central Anatolia

Region? etc. If you have determined a question you want to know the answer to, you can proceed to the next step.
2. Research To answer your question, first, research the available information on the topic. You can proceed more systematically by making a research plan. You can use any written, oral, or visual materials (book, magazine, encyclopedia, brochure, internet, film, sound recording, photograph, picture, poster, etc.) related to the topic. During your research, you can meet with experts on the subject; visit places such as universities, museums, zoos, botanical gardens; you can seek support from teachers of subjects such as science, technology, and design.
3. Hypothesise Determine what you want to do, in other words, the purpose of the project, in the light of the information you have acquired on the subject. The purpose here is to define the desired result to be obtained when the project is completed. Projects usually have only one purpose. Determining the purpose helps in establishing the hypothesis. The hypothesis is "our guess for the answer to our research question". In other words, it is "the situation or situations that are likely to arise as a result of the experiment". With this aspect, the hypothesis will guide us in observations, tests, and experiments. If you have a hypothesis like "If the weather is cold, the trees shed their leaves", you build your experiment to prove this idea. You need to test the accuracy of a hypothesis such as "If it does not rain enough, plants will lack zinc" with various experiments.
4. Time for Experiment and Observation You need to design an experiment, make observations and analyses to test your hypothesis and determine whether your predictions are correct. You have to conduct the experiment you designed in a 'controlled' manner. Experiments performed by changing one of the conditions that will affect the result and keeping the others constant are called "controlled experiments". Before you start testing a hypothesis, you need to understand the concepts of "experimental group", "control group", "dependent variable", and "independent variable". For example, suppose we are investigating how effective magnets are in the growth of plants. In that case, we should examine a group of plants in a magnet-free environment while examining a group of plants together with magnets. Thus, the group in which the magnet is used becomes the "experimental group" and the other "control group". Suppose you can understand to what extent magnets affect plant growth by examining the plant growth of two groups in the same period. The variable that can be changed and thought to affect the experimental group is the "independent variable". We can choose the independent variable as we want or change it at any time. For example, the magnet is the independent variable in the plant experiment. "Dependent variable", on the other hand, is the material that changes depending on the independent variables in the experiments and can be measured. If your hypothesis is set as "plants grow faster in a magnetic environment", you need to measure the growth in plants depending on the magnet with the experiment we will do. If we determine the plant height as the growth criterion of the plant, the dependent variable will be "the height of the plant". To run your experiment properly and validly, you must change one factor while keeping all other conditions constant.
5. Collect and Evaluate Data Precise information should be gathered during the experiment. This information is called 'data'. For example, in an experiment, the water temperature is read every ten minutes, and the values are recorded, or in the magnet experiment, the change in the height of the plant is measured and recorded at equal time intervals; this is data collection. The more data we get, the better we can support or refute our hypothesis. You need to analyse the data you record during and at the end of the experiment to determine whether your hypothesis was established correctly. You can make some decisions in line with the information you have obtained due to the research. If the results do not confirm the hypothesis, this does not mean that your experiment is wrong; it shows that you should revise your hypothesis. For example, suppose you conclude that the magnet does not affect plants due to your experiments conducted to test the hypothesis that "plants grow faster in a magnetised environment"; in that case, this result means that your hypothesis is wrong. If the hypothesis is wrong, a new hypothesis is established by starting the research from the beginning. If it is found that the hypothesis was established correctly, this result may need to be tested in another way. You can report the results you have obtained with your analysis and present them at the science festival.
6. Report Findings Your poster should be well organised as it promotes the whole project and should encourage visitors to read the project. Complicated and inelaborate posters will cause the project not to be comprehended well enough. The poster should reflect the project process. The poster should consist of three main sections: preparations before the experiment, experiment process, and experiment results. The first section should explain the pre-test preparations, the second section test experiment process, and the last section the post-experiment process. In the first part, the project summary, the research question or problem considered, the hypothesis established, and the studies conducted should be written. In the second part, the project's name, the materials used, the procedures applied, and the analysis should be included. The findings and evaluation should be in the last section. Suggestions for future studies and expected studies can also be written here.

Figure 4.

Process Steps in the 7th-grade Science Textbook

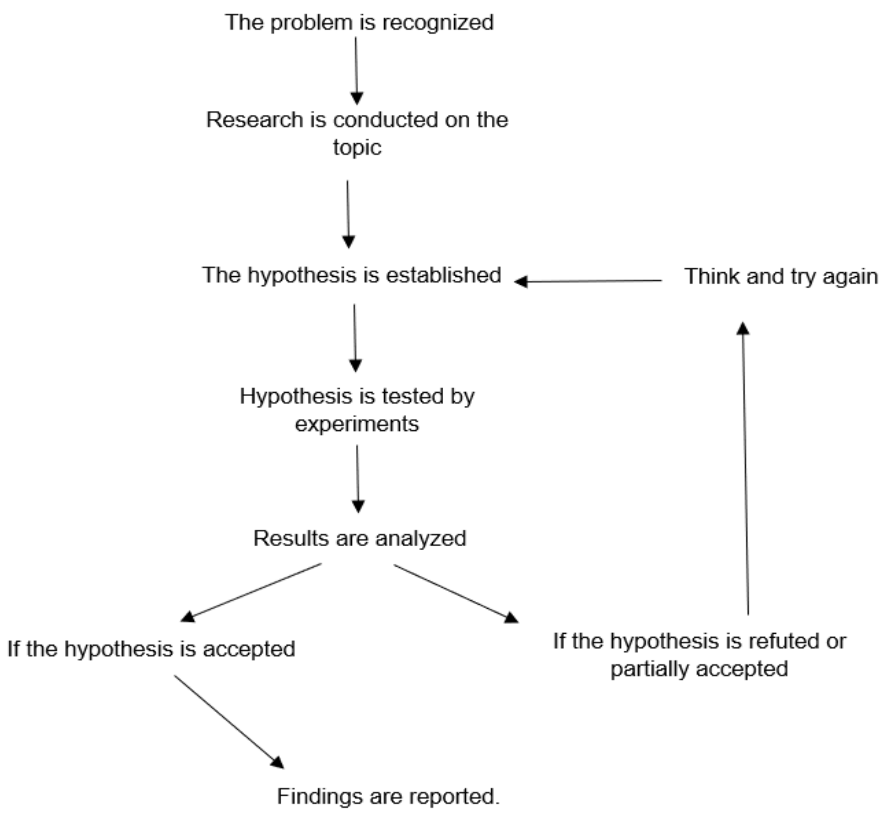


Figure 5.

Engineering Design Skills in the 7th-grade Science Textbook

ENGINEERING DESIGN PROCESS

If your project involves inventing a new model/tool, designing or developing an existing model/tool, you can follow the process of research and development project design.

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1. Define the problem.

The research and development project begins by asking the following questions about the problems you see:

- WHAT? What is the problem or what is needed?
- WHO? Who has a problem or who needs it?
- WHY? Why is it important to solve this problem?

---

2. Research.

For a research and development project, you should review the work others have done in that field and learn from their experiences. You should research two main areas:

- Who are the users and customers of the existing or potential product?

- What are the available solutions?
3. Define the requirements. Defining your design requirements is the most important step for your solution to the problem to be successful. To define the requirements, you should analyse the key features of existing solutions similar to the target design.
4. Create alternative solutions. There are multiple ways to solve design problems. If you focus on just one solution, you might miss another way that will provide you with a better solution. A good designer tries to find more than one solution.
5. Choose the best solution. You should check whether the solution alternatives you find meet the design requirements. Some solutions probably meet more requirements than others.
6. Improve the solution. It would be best to improve and develop your solution throughout the design process (even after the product has been launched).
7. Build a prototype. A prototype is the first sample that emerged in the process of solving the problem. Usually, simpler materials are used in building them, and they are made to test how the final product will work. It is an important step in the development of the end product.
8. Test your solution. Define the problems in running the solution by testing the solution you found, test again after you make the necessary changes. This way, you will have eliminated all the problems before presenting your final design.
9. Report the findings To complete your project, you must share your findings. After the model/tool is completed, a report should be written, presenting what has been done in the process. In addition to presenting the products by exhibiting them, summarise the project process with a poster.

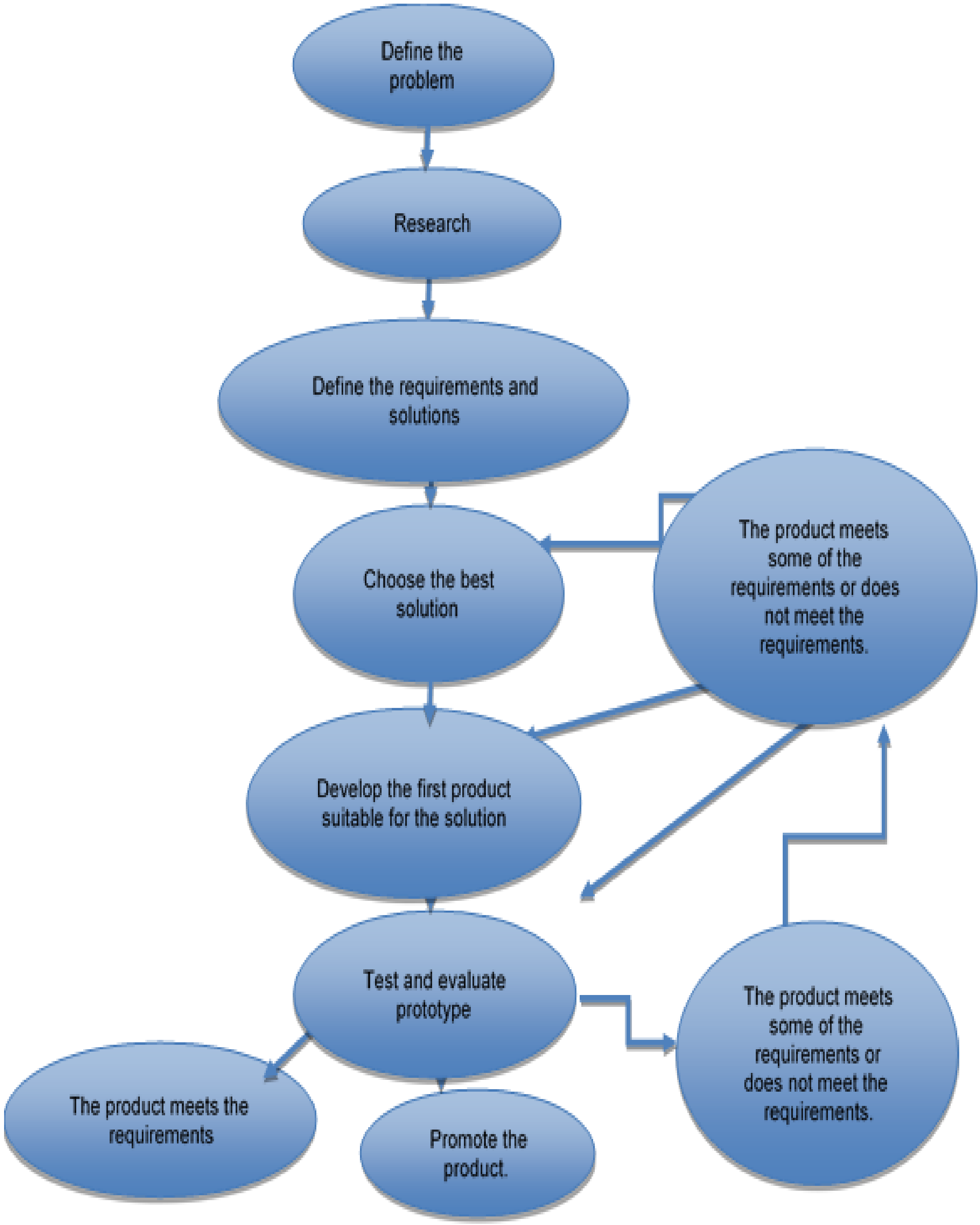
Figure 6.

Project Sample in the 7th-grade Science Textbook

PROJECT SAMPLE
Project name:
The purpose of the project:
The goals of the project:
Resources used in the research:
Materials/tools used:
Summary of the project or design:
The finding obtained :
Drawing of the design:
Area for drawing of the design:

Figure 7.

Engineering Design Process



Based on the analysis of the six project designs in the 7th-grade science textbook, according to the determined criteria, it was found that engineering, entrepreneurship, and SEE parts have common aspects in all projects in the book, even when the project topics are different. The common parts found in the project design sections are presented in Table-3 below.

Table 3.

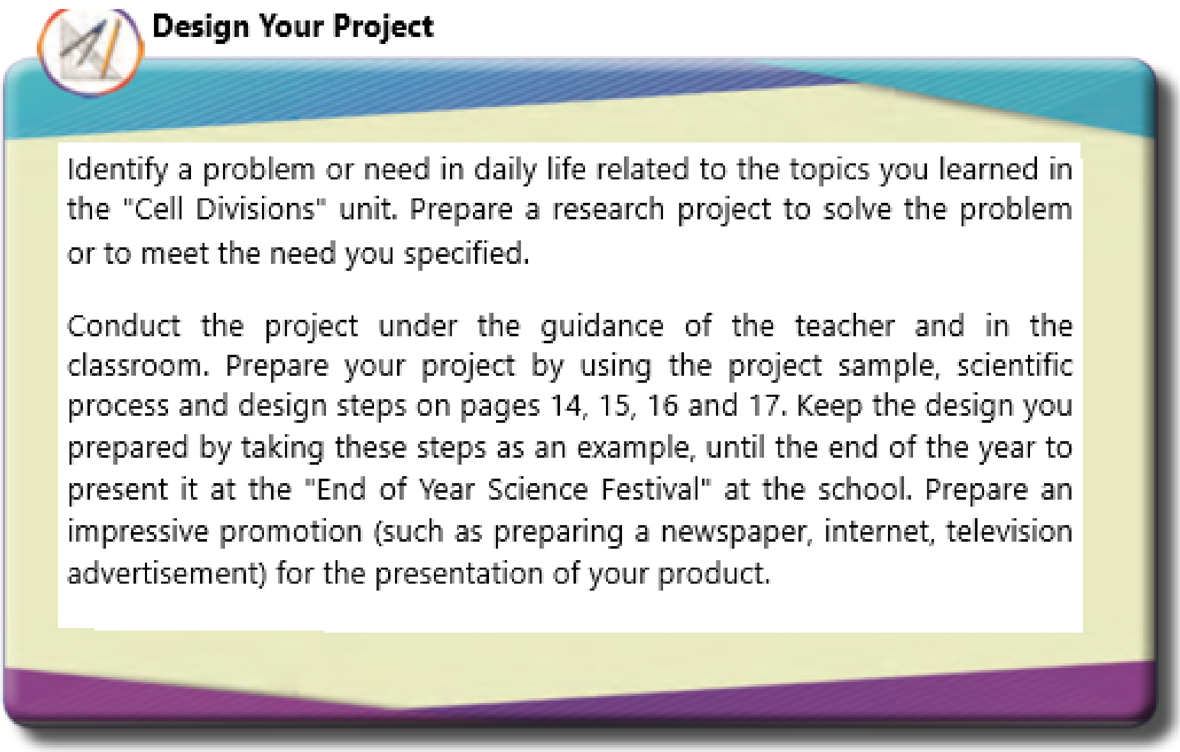
Common Points of Engineering, Entrepreneurship, and SEE Assessment Criteria for the 6 Projects

	Descriptions
Engineering	According to the statement *"… prepare your project using the scientific process and design steps…"* (Demirkazan et al., 2018, p. 72), it can be concluded that students are knowledgeable of the research steps while preparing their projects. Since the project design is left to the imagination and creativity of the student, the solution method and needs recognition for the model are considered skills that the students can gain through experience.
Entrepreneurship	The statement in the project description section, *"… Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product."* (Demirkazan et al., 2018, p.72) shows that students are offered various alternatives to introduce the model. Students are free while choosing the marketing method. According to the textbook's project design section, while various alternatives are offered for students to introduce the products they have designed, marketing strategies are not included. However, it is believed that students will learn these marketing strategies by experience in the science festival at the end of the year. According to the instruction, *"… Keep your project until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (newspaper, internet, television advertisement, etc.) for the presentation of your project."* (Demirkazan et al., 2018, p.146), students are asked to present the model they have created using various media tools such as the newspaper, internet, and television advertisements at the end of the year science festival. Anagun and Atalay (2017) state that an individual with entrepreneurial skills, one of the sub-dimensions of 21st-century skills, has personality traits such as being open to innovations, productive, active thinking, and risk-taking. It is believed that students will develop entrepreneurship skills within the scope of science, engineering, and entrepreneurship practices during the year. It will be beneficial for students to acquire skills such as communication, entrepreneurship, cooperation, flexibility, and adaptability by performing various tasks within the scope of science, engineering, and entrepreneurship applications.

Science, Engineering and Entrepreneurship	According to the instruction in the project section, *"… Prepare your project using the project sample on pages 14, 15, 16 and 17, scientific process and design steps…"* (Demirkazan et al., 2018, p.72), it can be concluded that students will obtain scientific knowledge by using their scientific process skills and design steps through their experiences. Additionally, EDP is included in the textbook after the scientific process skills (SPS) (Demirkazan et al., 2018). Therefore, it can be concluded that the steps that students will follow in this process help them establish a relationship between science and engineering. The instruction in the project description section *"… keep your design/project until the end of the year to present it at the "End of Year Science Festival" to be held at the school."* (Demirkazan et al., 2018, pp.72, 146, 149, 186, 231), indicates that the products designed will be exhibited and presented at the end of the term. Step "7. Create a prototype" in the EDP on page 16 of the textbook is believed to contribute to students' transformation of scientific knowledge into products by integrating it with engineering applications. There are no warnings related to material, time, and cost criteria in the project design section. However, the step in EDP on page 16 of the textbook, "3. Determine the Requirements", indicates that the characteristics of similar studies should be analysed to solve the specified problem.

Figure 8.

Project in Unit 2: "The Cell and Divisions" (Original figure is in appendix 1)



Design Your Project

Identify a problem or need in daily life related to the topics you learned in the "Cell Divisions" unit. Prepare a research project to solve the problem or to meet the need you specified.

Conduct the project under the guidance of the teacher and in the classroom. Prepare your project by using the project sample, scientific process and design steps on pages 14, 15, 16 and 17. Keep the design you prepared by taking these steps as an example, until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product.

Table 4.

Findings on Project in Unit 2: "The Cell and Divisions"

In terms of the science assessment criterion
The instruction in the project description, ***"Identify a problem or need in daily life related to the topics you learned in the unit of "Cell divisions". Prepare a research project to solve the problem or meet the need…"*** (Demirkazan et al., 2018, p.72), indicates that it is effective in determining a need or problem related to science. Additionally, the emphasis on choosing this need and problem from daily life shows that students can benefit from daily life in project design. It has been observed that there is no attainment regarding project design in the attainments of the "cell and divisions" unit in the 2018 science curriculum. Therefore, it is thought to be indirectly related to unit attainments.
In terms of the engineering assessment criterion
For the topic of the project, students are asked to create a research project on cell divisions. Since the project should follow the steps on pages 14, 15, 16, and 17, it was observed that this creates ambiguity in the type of project required for this unit. At this stage, students can continue the project process under the teacher's guidance and be active in the research project.

Figure 9.

Project in Unit 3: "Force and Energy" (Original figure is in appendix 2)

Design Your Project

You may have seen trucks with bodies behind them on the roads. Have you ever thought about what the parts on the cabs of these trucks that stand at an angle are for? Truck bodies are usually made higher than the truck cab to carry more load. This causes the body to be affected more by the air resistance and the movement of the truck becomes more difficult. An angled part added to the truck cabs changes the direction of the wind coming to the body while the truck is moving. Thanks to this simple solution, the air resistance affecting the truck is reduced. Therefore, fuel consumption is reduced.

Some living creatures have natural features that reduce the air and water resistance in their environments. It is a common method to be inspired by the creatures in nature to reduce air and water resistance. For example, fish are taken as an example for a submarine design and birds for a high-speed train design. In this way, the natural features of some living creatures are transferred to technological designs.

Design your own vehicle similar to these vehicles designed by engineers to reduce air and water resistance. Conduct the project under the guidance of the teacher and in the classroom. Prepare your project by using the project sample, scientific process and design steps on pages 14, 15, 16 and 17. Keep the design you prepared by taking these steps as an example, until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product.

Table 5.

Findings on Project in Unit 3: "Force and Energy"

In terms of the science assessment criterion
In the project description section, a problem that can be encountered in daily life ***"… This situation causes the body to be affected from the air resistance more and the movement of the truck becomes difficult…"*** (Demirkazan et al., 2018, p.103) and its solution are presented. Additionally, the sample case ***"… the natural characteristics of some living organisms are transferred to technological designs…"*** (Demirkazan et al., 2018, p. 103) shows that nature is a source of inspiration for technological designs. Giving examples of situations that can be encountered in daily life at the beginning of the project design shows that students recognise a need or problem in daily life and find a solution. This is directly related to the attainment "F.7.3.3.3. Designs a tool to reduce the effect of air or water resistance." in the 2018 science curriculum.
In terms of the engineering assessment criterion
Project topic enables students to develop a suitable model for the solution. Since 'force and energy' is a more effective unit for students to learn with models and experiences, it is thought that it enables them to design products suitable for the solution.
In terms of SEE assessment criterion
Step "7. Create a prototype" in EDP on page 16 of the textbook is thought to contribute to the students' transformation of scientific knowledge into products by integrating them with engineering applications. However, according to the F.7.3.3.3 attainment sub-item ***"b Designs are created by drawing, they are not transformed into a three-dimensional product"*** in the 2018 science curriculum indicates that students are not expected to transform their designs into three-dimensional products. Although the instruction in the project description section ***"... keep your design until the end of the year to present it at the 'End of Year Science Festival ..."*** (Demirkazan et al., 2018, p. 103) indicates that designed products are expected to be exhibited and presented at the end of the year, a three-dimensional product is not required by the attainments. Implying that students are expected to introduce their designs, which they produce only by drawing, in this process.

Figure 10.

1st Project in Unit 4: "Pure Substances and Mixtures" (Original figure is in appendix 3)

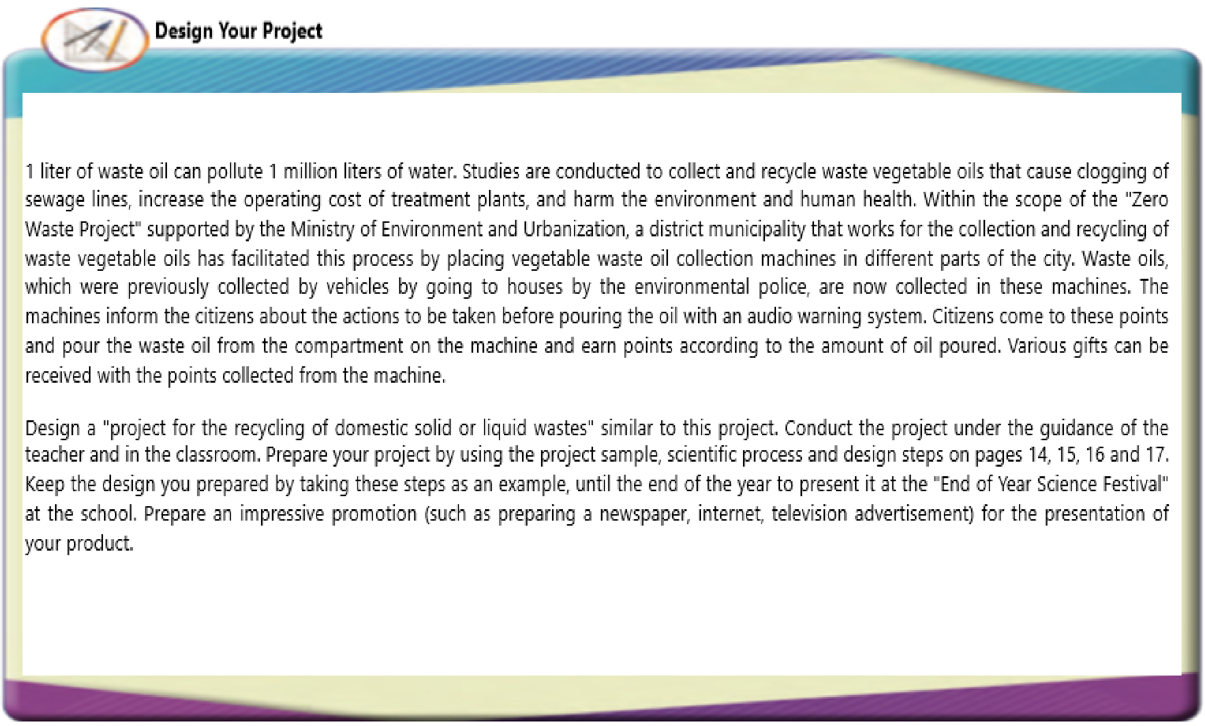


Table 6.

Findings on the 1st Project in Unit 4: "Pure Substances and Mixtures"

In terms of the science assessment criterion
Works carried out within the scope of the ***"… Zero Waste Project…",*** which is also carried out in daily life, are presented in the project description **starting with the problem of *"1 litre of waste oil can pollute 1 million litres of water …"*** (Demirkazan et al., 2018, p. 146). The instruction ***"… Develop a project for the recycling of domestic solid or liquid wastes" similar to this project …*** "(Demirkazan et al., 2018, p. 146) following an example of a project encountered in daily life shows that students are encouraged to identify and find a solution to a scientific need or problem they encounter in their daily life as they design their project. It is directly related to the attainment "F.7.4.5.2. Designs a project regarding the recycling of domestic solid and liquid wastes." in the 2018 science curriculum.
In terms of the engineering assessment criterion
According to the statement in the instruction, ***"… Similar to this project…"*** (Demirkazan et al., 2018, p. 146), students are expected to design a project that can create a solution to the problem they have defined by taking the project example as a reference while choosing their project topic. For this reason, the topic of the project is suitable for students to design an appropriate model for the solution.

Figure 11.

2[nd] Project in Unit 4: "Pure Substances and Mixtures" (Original figure is in appendix 4)

Design Your Project

Antalya - Konyaaltı Municipality has implemented a project that will prevent the used clothes from being thrown away and recycle them. The purpose of the "If You Don't Wear It, Let It be Worn Project" by Konyaaltı Municipality is to deliver unused clothes to those in need quickly and easily. Another purpose is to recycle the clothes and shoes that cannot be used and to bring them into the economy. Within this scope, "Used Clothes and Shoe Boxes" were placed at 200 different points. Konyaaltı Municipality officials said: "Our citizens will now be able to leave their clothes, shoes, bags or all kinds of textile products in these boxes. After the collected clothes are separated and cleaned, some of them will be delivered to the citizens in need living in Konyaaltı through our Directorate of Culture and Social Affairs, and the other part will contribute to the economy by recycling. The number of these boxes will also be increased based on demand. With this campaign, our citizens will also be able to make use of their unused belongings."

Design a project of your own "for the delivery of reusable items to those who need it", similar to the project conducted by Konyaaltı Municipality.

Conduct the project under the guidance of the teacher and in the classroom. Prepare your project by using the project sample, scientific process and design steps on pages 14, 15, 16 and 17. Keep the design you prepared by taking these steps as an example, until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product.

Table 7.

Findings on the 2[nd] Project in Unit 4: "Pure Substances and Mixtures"

In terms of the science assessment criterion
Based on the purpose given in the project description, ***"… The aim of the Konyaaltı Municipality's 'If You Do Not Wear, Let it be Worn Project' is to deliver unused clothes to the needy quickly and easily …"*** (Demirkazan et al., 2018, p. 149), a need related to recycling is explained by giving examples from daily life. Within this scope, the topic of the project meets a daily problem or need related to science. It is directly related to the attainment "F.7.4.5.5. Develops projects to deliver reusable items to those in need.." in the 2018 science curriculum.
In terms of the engineering assessment criterion
With the instruction for choosing the topic of the project, ***"… Similar to the project of Konyaaltı Municipality, you also develop a project of your own "for delivering reusable goods to those in need"*** (Demirkazan et al., 2018, p. 149), students are expected to design a project that can create a solution to the problem they have defined by taking the project sample as a reference. For this reason, the topic of the project is suitable for designing a solution-oriented model.

Figure 12.

Project in Unit 5: "The Interaction of Light with Matter" (Original figure is in appendix 5)

Design Your Project

Anton van Leeuwenhoek was born the son of a basket maker. At the age of 16, he apprenticed with a fabric merchant. He first became interested in simple magnifiers during those years. He continued to be interested in lenses after starting his own fabric business. Familiarity with the glass business made it easy for him to deal with lenses. Microscopes of that time had 20- or 30-times magnification. However, these magnification rates were not sufficient for research. There were also technical difficulties in producing them. Anton van Leeuwenhoek sought ways to manufacture his own microscope to make simple observations. He bought a copy of Robert Hooke's book, which describes his observations with the microscope. This book facilitated his research on microscopes. Later, Van Leeuwenhoek started developing his own microscope. Thanks to his knowledge of the lenses and his determination to work, he was able to achieve a magnification rate of more than 200 times.

Van Leeuwenhoek's design consisted of a single lens mounted through a small hole in a metal plate. Its position and focal point were adjusted by turning the two screws. Only the 8-10 cm long microscope had to be held close to the eye, requiring very good lighting and patience. Anton van Leeuwenhoek was the first to observe and identify microscopic creatures using his own handmade microscopes.

Van Leeuwenhoek designed an imaging tool using lenses. Use a lens (thin-edged, thick-edged), mirror (flat, hollow, bumpy) or other materials to design an "imaging tool" for your needs. First of all, you need to express your design to solve a problem or improve an existing tool with drawing. Conduct the project under the guidance of the teacher and in the classroom. Prepare your project by using the project sample, scientific process and design steps on pages 14, 15, 16 and 17. Keep the design you prepared by taking these steps as an example, until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product.

Table 8.

Findings on Project in Unit 5: "The Interaction of Light with Matter"

In terms of the science assessment criterion

Anton van Leeuwenhoek's story of developing his microscope is presented in the project description with the statement, ***"… The microscopes made up to that time had a magnification of 20 or 30 times. However, these magnifications were not sufficient for research. There were also technical difficulties in producing them. Anton van Leeuwenhoek sought ways to develop his own microscope to make simple observations…"*** (Demirkazan et al., 2018, p. 186). The statement ***"… Van Leeuwenhoek designed an imaging tool using lenses…"*** (Demirkazan et al., 2018, p. 186) shows students that they can benefit from daily life in solving a problem related to science. Accordingly, it is concluded that students are encouraged to benefit from daily life in solving a science-related need or problem by referring to the sample situation at the beginning of the section.

It is directly related to the attainment "F.7.5.3.5. Designs an imaging tool using mirrors or lenses." in the 2018 science curriculum.

In terms of the engineering assessment criterion

With the statement in the description about defining the needs of the project and reaching a solution, ***"…Design a similar "imaging tool" for your needs by using a lens (thin-edged, thick-edged), mirror (flat, hollow, bump) or other materials…"*** (Demirkazan et al., 2018, p.186), students are expected to design an original project by taking the project example as a reference. For this reason, the topic of the project is suitable for students to design a solution-oriented model.

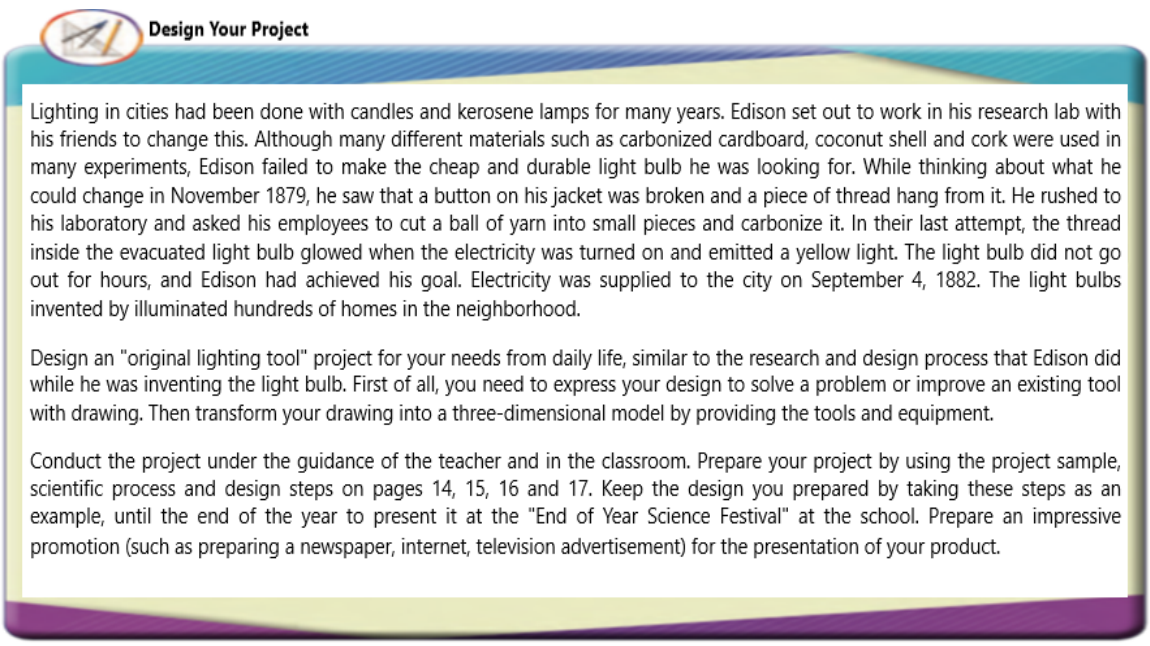
In terms of the SEE assessment criterion

The statement in the project design section, ***"… by using a lens (thin-edged, thick-edged), mirror (flat, hollow, bump) or other materials…"*** (Demirkazan et al., 2018, p.186), is an instruction for students to design projects using other materials. The statement ***"… if means are available…"*** in the MoNE 2018 science curriculum shows that the project is based on implementing the material, time, and cost criteria. Additionally, step "3. Define the Requirements" in EDP on page 16 indicates that to solve the specified problem, it is necessary to define the design requirements and analyse the features of similar studies. Therefore, it can be concluded that the curriculum and the instructions in the textbook are in agreement.

Step "7. Create a Prototype" in EDP on page 16 of the textbook is believed to help students integrate scientific knowledge with engineering applications and transform them into products. However, with the statement in the 2018 science curriculum, ***"First of all, students expected to express their design with drawing. If the means are available, they may be asked to transform it into a three-dimensional model."***, students are expected to transform their designs into three-dimensional products in line with the possibilities. In the textbook, there is an instruction stating hat ***"… you need to express your design with drawing first…"*** (Demirkazan et al., 2018, p. 186). This shows that the instruction in the textbook is in agreement with the relevant part of the curriculum.

Figure 13.

Project in Unit 7: "Electric Circuits" (Original figure is in appendix 6)


Design Your Project

Lighting in cities had been done with candles and kerosene lamps for many years. Edison set out to work in his research lab with his friends to change this. Although many different materials such as carbonized cardboard, coconut shell and cork were used in many experiments, Edison failed to make the cheap and durable light bulb he was looking for. While thinking about what he could change in November 1879, he saw that a button on his jacket was broken and a piece of thread hang from it. He rushed to his laboratory and asked his employees to cut a ball of yarn into small pieces and carbonize it. In their last attempt, the thread inside the evacuated light bulb glowed when the electricity was turned on and emitted a yellow light. The light bulb did not go out for hours, and Edison had achieved his goal. Electricity was supplied to the city on September 4, 1882. The light bulbs invented by illuminated hundreds of homes in the neighborhood.

Design an "original lighting tool" project for your needs from daily life, similar to the research and design process that Edison did while he was inventing the light bulb. First of all, you need to express your design to solve a problem or improve an existing tool with drawing. Then transform your drawing into a three-dimensional model by providing the tools and equipment.

Conduct the project under the guidance of the teacher and in the classroom. Prepare your project by using the project sample, scientific process and design steps on pages 14, 15, 16 and 17. Keep the design you prepared by taking these steps as an example, until the end of the year to present it at the "End of Year Science Festival" at the school. Prepare an impressive promotion (such as preparing a newspaper, internet, television advertisement) for the presentation of your product.

Table 9.

Findings on Project in Unit 7: "Electric Circuits"

In terms of the science assessment criterion
In the project description, Edison's adventure of inventing the light bulb is presented starting with the following statement, ***"… While thinking about what he could change in November 1879, he saw that a button of his jacket was broken and a piece of thread hung there…"*** (Demirkazan et al., 2018, p.231). With the instruction ***"… design an "original lighting tool" project for your needs from daily life, conducting a similar research and design process that Edison did while he was inventing the light bulb …"*** (Demirkazan et al., 2018, p.231), students are encouraged to benefit from daily life in the process of identifying and solving a science-related need regarding the sample situation. It is directly related to the attainment "F.7.7.1.6. Designs an original lighting tool." in the 2018 science curriculum.
In terms of the engineering assessment criterion
With the instruction ***"… design an "original lighting tool" project for your needs from daily life, conducting a similar research and design process that Edison did while he was inventing the light bulb …"*** (Demirkazan et al., 2018, p.231), students are expected to design an original project regarding the project example. For this reason, the project topic is suitable for students to design a solution-oriented model.
In terms of the SEE assessment criterion
In the project design section, there is an instruction for students to obtain materials so that they can transform their drawings into products, as ***"…by obtaining the tools and equipment later…"*** (Demirkazan et al., 2018, p.231). The statement ***"… if means are available"*** in the 2018 science curriculum indicates that the project implementation is based on the material, time, and cost criteria. Additionally, step "3. Define the Requirements" states that to solve the specified problem, it is necessary to define the design requirements and analyse the features of similar studies. Therefore, the curriculum and the instructions in the textbook are in agreement. Step "7. Create a Prototype" in EDP on page 16 of the textbook is believed to help students integrate scientific knowledge with engineering applications and transform them into products. However, with the statement given as a sub-dimension of attainment F.7.5.3.5. in the 2018 science curriculum, ***"First of all, students expected to express their design with drawing. If the means are available, they may be asked to transform it into a three-dimensional model."***, students are expected to transform their designs into three-dimensional products in line with the possibilities. In the textbook, there is an instruction stating that ***"… you need to express your design with drawing first. Then transform your drawing into a three-dimensional model by providing the tools and equipment."*** (Demirkazan et al., 2018, p. 186). This shows that the instruction in the textbook is not in agreement with the relevant part of the curriculum. While creating a three-dimensional product is optional in the curriculum, students are asked to transform their drawings into a three-dimensional model in the textbook.

Conclusion and Discussion

Six projects were analysed in the present study, aiming to evaluate the 7th-grade science textbook taught in the 2018-2019 academic year in terms of SEE applications. The findings indicated differences between the instructions in some textbook units and definitions in the curriculum attainments in SEE applications. According to the science assessment criterion, an agreement between the textbook and attainments cannot be achieved in the unit of "cells and divisions". While no disagreement was found in the engineering and entrepreneurship evaluation criteria, there were some lacking points regarding material, time, and cost according to SEE evaluation criteria. Additionally, there is not one SEE application for each unit.

In terms of science assessment criterion, it was found that the attainments of the textbook and the curriculum in the units "Force and Energy", "Pure Matter and Mixtures", "The Interaction of Light with Matter", and "Electric Circuits" were in agreement. However, in the unit of "Cell and Divisions", the relationship between the textbook and the attainments was indirect. It is undeniable that the curriculum, teacher qualifications, and student-teacher communication are as effective as textbooks to effectively perform science education (Atici, Keskin Samancı & Ozel, 2007). Textbooks written in line with the curricula are supportive elements of the education process (Bostan Sarioglan, Can & Gedik, 2016). In this context, the coordination between the science curriculum of the "Cell and Divisions" unit and the textbook could not be achieved. The differences between the science textbook and the curriculum make it compulsory for teachers to benefit from both sources when creating the teaching environment.

In the engineering assessment criterion, the six project design sections in the textbook are considered a skill area in which the students are aware of the steps of conducting research, finding solutions, and have recognition acquired as a result of their experiences. In the learning environment, students undertake the role of an individual who researches, questions, explains, and transforms information into products (MoNE, 2018). With the project design sections, students are provided with a suitable environment to fulfil these roles. It was found that the project design parts in the units "Force and Energy", "Pure Substances and Mixtures", "The Interaction of Light with Matter", and "Electrical Circuits" enable students to develop a suitable model for the solution. In contrast, in the unit "Cell and Partitions", students may experience some difficulties. According to Kizilay (2018), the reflection of developments and changes in our education system in our age requires that pre-service science teachers, who will be the guides of the science course, have sufficient knowledge about engineering, entrepreneurship, and design. Therefore, teachers and pre-service teachers who are well-equipped in engineering, entrepreneurship, and design can provide effective science education and solve the difficulties encountered.

In the entrepreneurship assessment criterion, it is stated in the project design parts in the units of "Cell and Divisions", "Force and Energy", "Pure Substances and Mixtures", "The Interaction of Light with Matter", and "Electric Circuits" that model presentation will provide students with 21st-century and entrepreneurial skills. Individuals of our age should have 21st-century skills such as researching, questioning, critical thinking, collaboration with others, and problem-solving (Eryilmaz & Uluyol, 2015). It can be reported that the project design parts contribute to the training of individuals who are fit for 21st-century requirements. Students acquire scientific process skills, life skills, engineering and design skills and transform these skills into applications in entrepreneurship and technology with the attainments in the science curriculum (Eke, 2018). This way, coordination between the curriculum and the textbook is ensured. Although different marketing alternatives are presented to the students to introduce the products they designed at the end of year science festival, marketing strategies are not included in the project applications. For students to acquire marketing strategies, the product should be evaluated first. It is not possible to make progress on this only with the instructions in books. According to MoNE (2018), students acquire entrepreneurship skills while creating strategies and using promotional tools to market their products. Therefore, it is aimed that the students acquire entrepreneurship skills by experiencing them.

In the SEE assessment criteria, it is stated in the project design sections in the units "Cell and Divisions", "Force and Energy", "Pure Substances and Mixtures", "The Interaction of Light with Matter", and "Electric Circuits" that students can acquire scientific knowledge as a result of their experiences by using the scientific process skills and design steps. Additionally, the successive presentation of the scientific process skills and EDP in the textbook concludes that it helps students establish a relationship between the two. Individuals use scientific process skills throughout their education and training processes, especially in science, physics, chemistry, and engineering (Yildirim & Altun, 2015). EDP is effective in developing students' scientific process skills. Therefore, it can be claimed that scientific process skills and engineering design processes constitute the infrastructure of the project design.

Although a description based on material, time, and cost criteria is included in some project design sections, it was not included in other sections. Making the necessary explanations in the EDP content of the textbook is a complement to the project design sections. Similarly, it is included in the relevant description sections that students are not expected to create a product by combining scientific knowledge with engineering applications and turning their designs into a three-dimensional model. Creating a three-dimensional model depends on the conditions. However, in the EDP content of the textbook, some instructions are complementary to these explanations. Teachers must make a lesson plan that integrates the curriculum with the textbook to prepare an effective science learning environment.

Different expressions in the project design sections state that there will be an end-of-year science festival where the products designed by students will be exhibited and presented at the end of the semester.

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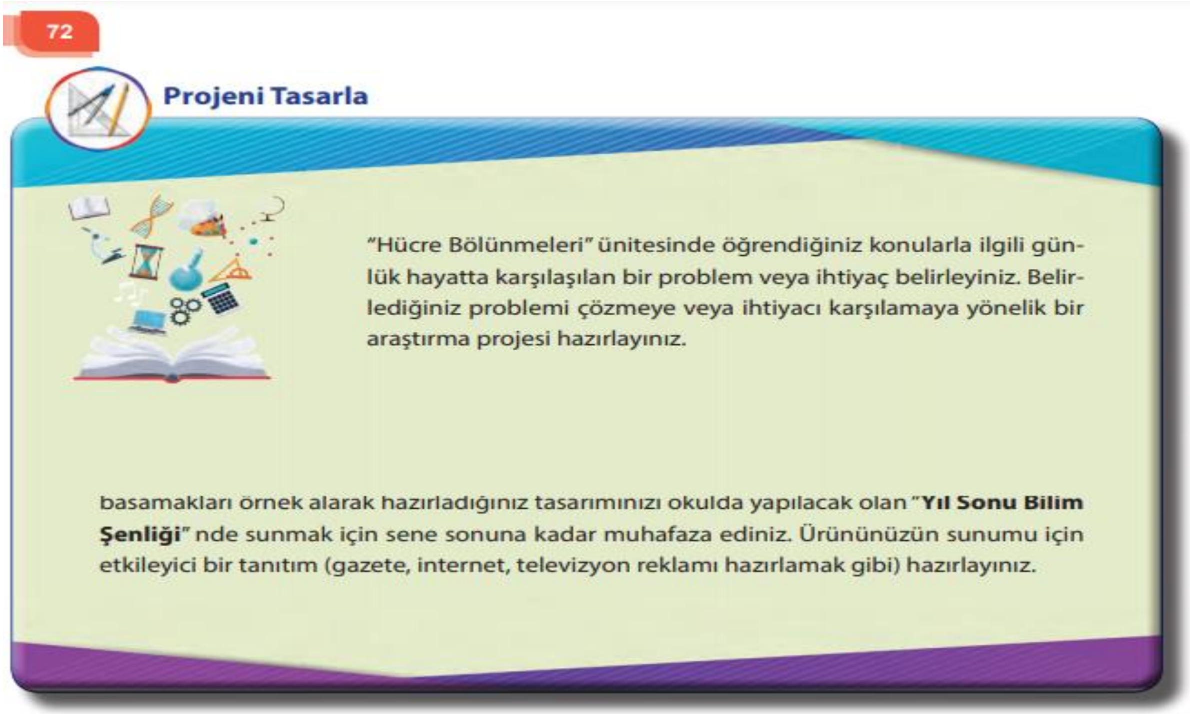
Appendices

Appendix 1. Project in Unit 2: "The Cell and Divisions"



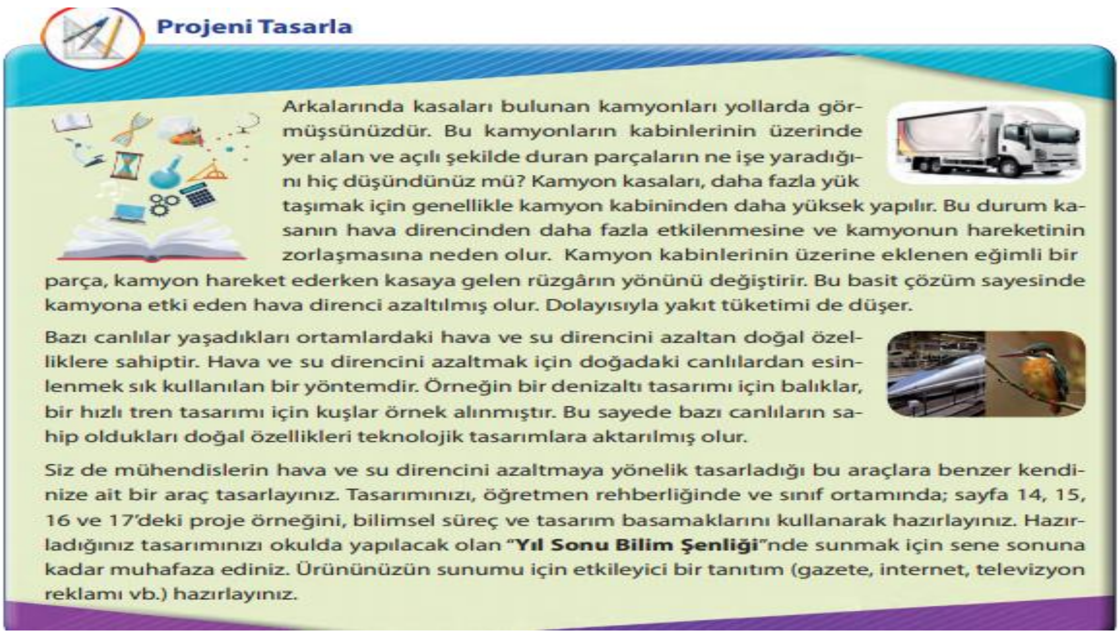
72

Projeni Tasarla

"Hücre Bölünmeleri" ünitesinde öğrendiğiniz konularla ilgili günlük hayatta karşılaşılan bir problem veya ihtiyaç belirleyiniz. Belirlediğiniz problemi çözmeye veya ihtiyacı karşılamaya yönelik bir araştırma projesi hazırlayınız.

basamakları örnek alarak hazırladığınız tasarımınızı okulda yapılacak olan "**Yıl Sonu Bilim Şenliği**" nde sunmak için sene sonuna kadar muhafaza ediniz. Ürününüzün sunumu için etkileyici bir tanıtım (gazete, internet, televizyon reklamı hazırlamak gibi) hazırlayınız.

Appendix 2. Project in Unit 3: "Force and Energy"



Projeni Tasarla

Arkalarında kasaları bulunan kamyonları yollarda görmüşsünüzdür. Bu kamyonların kabinlerinin üzerinde yer alan ve açılı şekilde duran parçaların ne işe yaradığını hiç düşündünüz mü? Kamyon kasaları, daha fazla yük taşımak için genellikle kamyon kabininden daha yüksek yapılır. Bu durum kasanın hava direncinden daha fazla etkilenmesine ve kamyonun hareketinin zorlaşmasına neden olur. Kamyon kabinlerinin üzerine eklenen eğimli bir parça, kamyon hareket ederken kasaya gelen rüzgârın yönünü değiştirir. Bu basit çözüm sayesinde kamyona etki eden hava direnci azaltılmış olur. Dolayısıyla yakıt tüketimi de düşer.

Bazı canlılar yaşadıkları ortamlardaki hava ve su direncini azaltan doğal özelliklere sahiptir. Hava ve su direncini azaltmak için doğadaki canlılardan esinlenmek sık kullanılan bir yöntemdir. Örneğin bir denizaltı tasarımı için balıklar, bir hızlı tren tasarımı için kuşlar örnek alınmıştır. Bu sayede bazı canlıların sahip oldukları doğal özellikleri teknolojik tasarımlara aktarılmış olur.

Siz de mühendislerin hava ve su direncini azaltmaya yönelik tasarladığı bu araçlara benzer kendinize ait bir araç tasarlayınız. Tasarımınızı, öğretmen rehberliğinde ve sınıf ortamında; sayfa 14, 15, 16 ve 17'deki proje örneğini, bilimsel süreç ve tasarım basamaklarını kullanarak hazırlayınız. Hazırladığınız tasarımınızı okulda yapılacak olan "**Yıl Sonu Bilim Şenliği**"nde sunmak için sene sonuna kadar muhafaza ediniz. Ürününüzün sunumu için etkileyici bir tanıtım (gazete, internet, televizyon reklamı vb.) hazırlayınız.

Appendix 3. 1st Project in Unit 4: "Pure Substances and Mixtures"

Projeni Tasarla

1 litre atık yağ 1 milyon litre suyu kirletebilmektedir. Kanalizasyon hatlarının tıkanmasına neden olan, arıtma tesislerinin işletme maliyetini arttıran, çevre ve insan sağlığına zarar veren atık bitkisel yağların toplanması ve bu yağların geri dönüşümünü sağlamak amacıyla çalışmalar yapılmaktadır. Çevre ve Şehircilik Bakanlığı tarafından da desteklenen "Sıfır Atık Projesi" kapsamında atık bitkisel yağların toplanması ve geri dönüşümü için uğraş veren bir ilçe belediyesi şehrin farklı yerlerine bitkisel atık yağ toplama makineleri koyarak bu işlemi kolaylaştırmıştır. Daha önce çevre zabıtası tarafından evlere gidilerek araçla toplanan atık yağlar artık bu makinelerde toplanmaktadır. Makineler, yağı dökmeden önce yapılacak işlemler hakkında sesli uyarı sistemiyle vatandaşlara bilgi vermektedir. Vatandaşlar bu noktalara gelip atık yağlarını makinenin üzerinde bulunan bölmeden dökerek, döktükleri yağ miktarına göre puan kazanmaktadırlar. Makineden toplanan puanlarla çeşitli hediyeler alınabilmektedir.

Siz de yapılan bu projeye benzer "Evsel katı veya sıvı atıkların geri dönüşümüne yönelik bir proje" geliştirin. Projeyi, öğretmen rehberliğinde ve sınıf ortamında; sayfa 14, 15, 16 ve 17'de verilen proje örneğini, bilimsel süreç ve tasarım basamaklarını kullanarak geliştiriniz. Bu basamakları örnek alarak geliştirdiğiniz projenizi okulda yapılacak olan "**Yıl Sonu Bilim Şenliği**"nde sunmak için sene sonuna kadar muhafaza ediniz. Projenizin sunumu için etkileyici bir tanıtım (gazete, internet, televizyon reklamı vb.) hazırlayınız.

Appendix 4. 2nd Project in Unit 4: "Pure Substances and Mixtures"

Projeni Tasarla

Antalya - Konyaaltı Belediyesi, kullanılmış kıyafetlerin çöpe atılmasını önleyerek geri dönüştürülmesini sağlayacak bir projeyi hayata geçirdi. Konyaaltı Belediyesinin yaptığı "**Giymiyorsan Giydir Projesi**"nin amacı, kullanılmayan kıyafetleri ihtiyaç sahiplerine hızlı ve kolayca ulaştırmaktır. Bununla birlikte kullanılamayacak durumda olan kıyafet ve ayakkabıları da geri dönüşüme göndererek ekonomiye kazandırmaktır. Bu kapsamda 200 ayrı noktaya "Kullanılmış Giysi ve Ayakkabı Kumbaraları" yerleştirildi. Konyaaltı Belediyesi yetkilileri: "Vatandaşlarımız, artık dolapta beklettikleri giysi, ayakkabı, çantalarını veya her türlü tekstil ürününü bu kumbaralara bırakabilecekler. Toplanan giysiler, ayrıştırılıp temizlendikten sonra bir kısmı Kültür ve Sosyal İşler Müdürlüğümüz vasıtasıyla Konyaaltı'nda yaşayan ihtiyaç sahibi vatandaşlarımıza ulaştırılacak, diğer kısmı ise geri dönüşüme gönderilerek ekonomiye kazandırılacak. Gelen taleplere göre kumbaraların sayıları da arttırılacak. Bu kampanya ile vatandaşlarımız kullanmadıkları eşyalarını da değerlendirmiş olacak." dedi.

Siz de Konyaaltı Belediyesinin yapmış olduğu projeye benzer kendinize ait "Yeniden kullanılabilecek eşyaların, ihtiyacı olanlara iletilmesine yönelik" bir proje geliştiriniz.

Projenizi, öğretmen rehberliğinde ve sınıf ortamında; sayfa 14, 15, 16 ve 17'de verilen proje örneğini, bilimsel süreç ve tasarım basamaklarını kullanarak geliştiriniz. Bu basamakları örnek alarak geliştirdiğiniz projenizi okulda yapılacak olan "**Yıl Sonu Bilim Şenliği**"nde sunmak için sene sonuna kadar muhafaza ediniz. Projenizin sunumu için etkileyici bir tanıtım (gazete, internet, televizyon reklamı vb.) hazırlayınız.

Appendix 5. Project in Unit 5: "The Interaction of Light with Matter"

Projeni Tasarla

Anton van Leeuwenhoek (Anton van Lövenhuk), bir sepetçinin oğlu olarak dünyaya geldi. 16 yaşındayken bir kumaş tüccarının yanında çıraklık yaptı. Basit büyüteçlerle ilk defa o yıllarda ilgilenmeye başladı. Kendi kumaş işini kurduktan sonra da merceklerle ilgilenmeye devam etti. Cam işine aşina olması, merceklerle uğraşmasını kolaylaştırıyordu. O zamana kadar yapılan mikroskoplar 20 veya 30 kat büyütme oranına sahipti. Ancak bu büyütme oranları araştırmalar için yeterli değildi. Ayrıca bunları üretmenin teknik zorlukları vardı. Anton van Leeuwenhoek basit gözlemler yapmak için, kendi mikroskobunu üretmenin yollarını araştırdı. Robert Hooke'un mikroskop ile yaptığı gözlemlerini anlatan kitabının bir kopyasını aldı. Bu kitap, mikroskoplarla ilgili araştırmalarını kolaylaştırdı. Daha sonra Van Leeuwenhoek, kendi mikroskobunu geliştirmeye başladı. Mercek konusundaki bilgisi ve çalışma azmi sayesinde 200 katın üzerinde büyütme oranı elde etmeyi başardı.

Van Leeuwenhoek'in tasarımı, metal bir levha üzerindeki küçük bir deliğe monte edilen tek bir mercekten oluşuyordu. Konumu ve odak noktası iki vidanın döndürülmesi ile ayarlanıyordu. Sadece 8-10 cm uzunluğundaki mikroskop göze yakın tutulmalıydı, bu da çok iyi bir ışıklandırma ve sabır gerektiriyordu. Anton van Leeuwenhoek, kendi tasarımı olan el yapımı mikroskoplar kullanarak mikroskobik canlıları gözlemleyen ve tanımlayan ilk kişi oldu.

Van Leeuwenhoek mercekler kullanarak bir görüntüleme aracı tasarlamıştır. Siz de mercek (ince kenarlı, kalın kenarlı), ayna (düz, çukur, tümsek) ya da başka malzemeler kullanarak kendi ihtiyaçlarınıza yönelik bir "görüntüleme aracı" tasarlayınız. Bir problemi çözmeye ya da varolan bir aracı geliştirmeye yönelik tasarımınızı öncelikle çizimle ifade etmeniz gerekmektedir. Projeyi, öğretmen rehberliğinde ve sınıf ortamında; sayfa 14, 15, 16 ve 17'de verilen proje örneğini, bilimsel süreç ve tasarım basamaklarını kullanarak geliştiriniz. Geliştirdiğiniz projenizi okulda yapılacak olan **"Yıl Sonu Bilim Şenliği"**'nde sunmak için sene sonuna kadar muhafaza ediniz. Projenizin sunumu için etkileyici bir tanıtım (gazete,internet, televizyon reklamı vb.) hazırlayınız.

Appendix 6. Project in Unit 7: "Electric Circuits"

Projeni Tasarla

Şehirlerde aydınlatma uzun yıllar boyunca mum ve gaz lambaları ile yapılmıştı. **Edison** bu durumu değiştirmek için arkadaşlarıyla kendi araştırma laboratuvarında işe koyuldu. Defalarca yapılan denemelerde kömürleştirme işleminden geçmiş mukavva, Hindistan cevizi kabuğu, mantar gibi pek çok farklı madde kullanılmasına rağmen Edison aradığı ucuz ve dayanıklı ampulü yapmayı başaramadı. 1879 yılının Kasım ayında neleri değiştirebileceğini düşünürken ceketinin bir düğmesinin kopuk olduğunu ve oradan bir iplik parçasının sarktığını gördü. Birden yerinden fırlayıp laboratuvarına giderek çalışanlarından bir yumak ipliği küçük parçalara ayırıp kömürleştirmelerini istedi. Yaptıkları bu son denemede havası boşaltılmış ampulün içindeki iplik, elektrik verildiğinde kızardı ve etrafa sarı bir ışık yaydı. Ampul saatlerce sönmedi ve Edison amacına ulaşmış oldu. 4 Eylül 1882 tarihinde şehre elektrik akımı verildi. Edison'un icat ettiği ampuller mahalledeki yüzlerce evi aydınlattı.

Siz de Edison'un ampulü icat ederken yaptığı araştırma ve tasarım sürecine benzer günlük hayattan bir ihtiyacınıza yönelik "özgün bir aydınlatma aracı" projesi tasarlayınız. Bir problemi çözmeye ya da var olan bir aracı geliştirmeye yönelik tasarımınızı öncelikle çizimle ifade ediniz. Daha sonra araç-gereçleri temin ederek çiziminizi üç boyutlu modele dönüştürünüz.

Projeyi, öğretmen rehberliğinde ve sınıf ortamında; sayfa 14, 15, 16 ve 17'de verilen proje örneğini, bilimsel süreç ve tasarım basamaklarını kullanarak geliştiriniz. Geliştirdiğiniz projenizi okulda yapılacak olan **"Yıl Sonu Bilim Şenliği"**'nde sunmak için sene sonuna kadar muhafaza ediniz. Projenizin sunumu için etkileyici bir tanıtım (gazete, internet, televizyon reklamı vb.) hazırlayınız.

Journal of Qualitative Research in Education

ENAD ONLINE

How should a Resource Room Programme for Gifted Students be Integrated into School System? *

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Abstract: The present research aims to determine the problems encountered during the integration of a resource room for gifted students in a primary school system and examining the measures developed for dealing with these problems. Structured as an action research, this research project was conducted in a primary school in the Eskisehir province of Turkey. Participants in this research consisted of the school headmaster, the teacher of the resource room, gifted students attending the resource room, parents of gifted students and classroom teachers whose students attended the resource room, researchers and the members of the evaluation board. Data were collected using interviews, meeting reports, documents and the researcher's diary. The research data were analyzed using the systematic analysis approach. The findings of this research showed that the resource room were generally positively perceived; however, several problems were observed as the programme was carried out during regular class hours. The findings obtained in this study suggest that in order for the gifted student resource room to be efficient, it should be implemented in coordination with classroom teachers.

Keywords: Gifted students, resource room, action research.

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Introduction

Gifted individuals and the need for special education for them continue to be a controversial issue in society and among professionals. According to Davis and Rimm (2004), gifted students are a special group of students who have higher-level cognitive skills and creativity than their peers. Gifted students' quick and easy learning due to their information processing speed is regarded as their most distinctive feature (Calero, Belen & Robles, 2011; Cohen, 2006; Gagné, 2003; Gallagher, 2000; Passow & Frasier, 1996; Subotnik, Olszewski-Kubilius & Worrell, 2012). In addition, with their high-level mental skills, such as strong memories (Alloway & Elsworth, 2012; Geake, 2008), abstract thinking skills (Kettler, 2014; Persson, 2010), understanding complex concepts and relationships (Morelock & Morrison, 1999; VanTassel-Baska, 1987), gifted students come to the forefront in general education classes. These characteristics of gifted students enable them to quickly comprehend the lessons given in general education classes, and this is accompanied by the need for a more challenging education.

Since the education process in general education classrooms has focused on the education of students with typical development, it has difficulty, with its present condition, in responding to the educational needs of gifted students (Archambault, Westberg, Brown, Hallmark, Emmons & Zhang, 1993; Osin & Lesgold, 1996). Researchers state that gifted children need a challenging education concerning content, speed and scope in accordance with their characteristics (Archambault et al., 1993; Callahan, Moon, Oh, Azano & Hailey, 2015; Kearney, 1996; Osin & Lesgold, 1996; Moon, Swift & Shallenberger, 2002; Weber, Johnson & Tripp, 2013). Given the practices carried out to meet these educational needs of gifted students, different educational options are observed, from classroom practices to educational opportunities in completely separate schools (Callahan, Moon & Oh, 2017).

One of the widespread offered education options for gifted students is a pull-out program which is known as the resource room (RR). The resource room is used as an enrichment strategy that aims to serve students with special needs at K-12 grade levels in Turkey (Gucyeter, Kanli, Ozyaprak & Leana-Tascilar, 2017). In the application of RR, although students attend general education classes, they also receive support education in a different classroom environment at school for certain times per week in accordance with their individual needs (Cox & Daniel, 1984; NAGC, 2010; Rogers, 2002). Despite the intensive use of RR programs in the education of gifted students, there is no consensus on its implementation (Gubbins, 2013). Differences of opinion focus on particularly the time to spend in RR, the content of the education to be given and who will be the teachers (Cox & Daniel, 1984; Davis, Rimm & Siegle, 2011; Gallagar, 2000; MEB, 2015a; Suel, 2017; Sahin, 2015). Although RRs are easy to open and low in cost, they have faced various criticisms. In the studies conducted in RRs the focus is on various games and activities disjointedly from the general education program (Renzulli & Reis, 1991; Rogers, 2002; Sak, 2014; VanTassel-Baska, 1987) and that its activities, such as problem solving and creative thinking, are not connected with the general education program (Borland, 2013; Rogers, 2002), and that they are inadequate to meet the educational needs of the gifted students because students only benefit from these programs on certain days and hours (Clark, 2013; Feldhusen, 1989; Murphy, 2009) are the basic criticisms which are frequently expressed.

On the other hand, in the studies on RR and/or pull-out programs, it has been found that these programs generally have positive effects (Gubbels, Seger & Verhoeven, 2014; Kulik & Kulik, 1992, 2003; Rogers, 1991, 2002; Vaughn, Feldhusen & Asher, 1991). As positive effects of these programs, including challenging activities for students, students' satisfactions (Yang, Gentry & Choi, 2012), increasing student success (Aldrich & Mills, 1989; Dimitriadis, 2011; Kulik & Kulik, 1992), having a positive effect on their behavior (Dimitriadis, 2011), contributing to motivation and individual thinking skills (Moon et al., 1995) and increasing their creative skills (Delcourt, 1993), draw the attention at first.

In Turkey, there are very few studies related to RR for gifted students. The majority of the studies focus on participant views on the shortcomings and effects of RRs. In the study conducted by Bedur, Bilgic, and Taslidere (2015), with the participation of teachers from different provinces, the lack of equipment in the rooms and the shortcomings of teachers in preparing appropriate programs and their needs for support draw attention. Pemik (2017) emphasizes that the students generally play intelligence games in these rooms. Moreover, it is stated that there are problems in the programs, which have been carried out, due to the lack of curriculum and instructional plan and inadequate physical conditions and materials. In their studies, Tortop and Dincer (2016) and Nar and Tortop (2017) include findings regarding the deficiencies of in-service training of teachers working here as well as insufficient physical environment and materials. In the literature, it is seen that the studies on the RR for gifted students at the national level are mostly descriptive studies, that is, they have focused on the current situation of RR. Research results indicate that there are differences among the RR practices for the gifted students in Turkey and that they are generally teacher-oriented rather than systematic practices. Furthermore, it is noteworthy that the teachers working in RR have severe problems, especially in developing appropriate programs for the students.

In Turkey, the gifted are evaluated within special education groups. Concordantly, regulations for the gifted are generally made with the same regulations for other special education groups. In the circular numbered 2015/15 (Ministry of National Education [MoNE], 2015a) related to the opening of RR in schools, it has become compulsory to open resource rooms for students with special needs and gifted students who continue their education in the same class with their typical developed peers. In the Regulation for Special Education Services (MoNE, 2018), the resource room is defined as "the environment designed to provide support education services to the students who continue their education through full-time mainstreaming and to gifted students in the fields they need" (MoNE, 2018, p. 1). In Article 25 of the same regulation, the process of RR is explained. In the regulation, the purpose of RR is explained as providing special education support via special equipment and educational materials for students with special education needs and gifted students. In the regulations, time and space restrictions have been made related to RR. In the relevant regulations, it is emphasized that the education to be provided in the RR should not exceed 40% of a student's weekly course hours during school course hours (MoNE, 2015b). This situation limits the duration of the program to 12 hours in primary schools. While, in the regulations, it is advised that individualized education should be provided in RR, it is also possible, if necessary, to provide group education where up to three students whose educational performance is at the same level (MoNE, 2015b). The teachers employed primarily in resource rooms are special education teachers. Primary school teachers and branch teachers can also be employed (MoNE, 2015a). Resource room teachers are not required to have any formal background in gifted education, which is a disadvantage mostly because there are not enough gifted specialists (Gucyeter et al., 2017).

Because a central policy is followed in education in Turkey, schools' making decisions at the local level is difficult. This situation also restricts the schools to the practices determined by the ministry regarding the education of gifted students. As a result of legal regulations in Turkey, RR programs come into prominence as an education option that may be applied for gifted students in state schools. However, there is no detailed resource on how to do educational planning for gifted students in these rooms. The education to be given here is under the initiative of the school administration. This causes RR practices for gifted students to stay on paper in some schools. Indeed, in Turkey, in the studies related to the RR practices for the gifted students (Bedur, Bilgic & Taslidere, 2015; Nar & Tortop, 2017; Pemik, 2017), it is emphasized that there are problems in the educational contents and also the given education is not sufficient for these students. The results of these studies reveal that there is a need for practice-based studies to conduct the RR programs for gifted students correctly and effectively in Turkey. In other words, although the RR has been started to be used in the education of the gifted students in Turkey, it is not known how the program has been conducted, whether there have been any problems in the process or not and if there have been, how to overcome these problems. With this research, it can be said that the results concerning how qualified planning and applications of RR for mainly gifted students can be realized can be revealed. In addition, this research can be a guide on how to meet the needs of gifted students nationally and internationally. Based on these thoughts, the general purpose of this study is to determine the problems encountered in the process of integrating the RR program for gifted students in a primary school, to the school system and to examine the intervention process carried out to solve these problems. Thus, answers to the following research questions have been searched during the research process:

1. What is the current situation of the resource room program for gifted students in the primary school, which has been focused on in the school system?

2. What are the interventions performed in the process of integrating the resource room program into the school system?

Methodology

Research Design

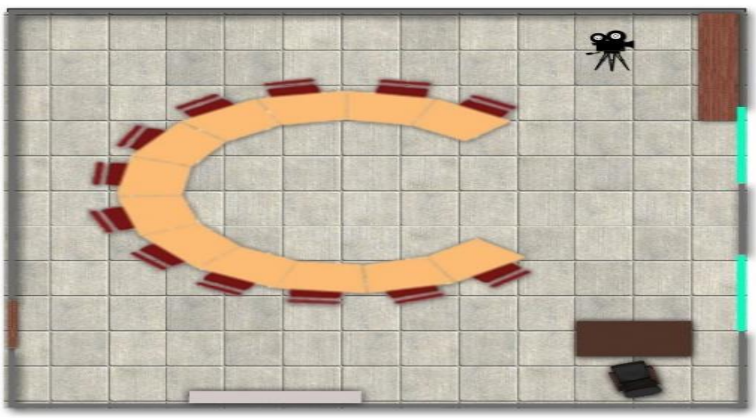
This research was designed as action research to examine and develop the integration process of the RR program for gifted students in a primary school into the school system. It is seen that process and development aspects come to the fore in the different definitions of action research (Johnson, 2014; Stringer, 2007; Yildirim & Simsek, 2016). Since this study was planned as a process-oriented study, it was intended that the problems encountered during the implementation process were determined, solutions were developed, and these solutions were put into practice, so the action research design was considered proper for this study.

Research Environment

This research was conducted in a primary school in Eskisehir/Turkey. The school consists of two buildings. Full-day education is given between 09:00 am and 2:40 pm at the school. The RR, which is the classroom in which the education for gifted students is carried out, is located on the second floor of the B-block of the school. The RR has a position on the left at the floor entrance, facing the garden. On the right of the RR is the science laboratory, and there is the counselling service opposite it. The sketch of the RR, whose interior design is different from the other classrooms of the school, is given in Figure 1.

Figure 1.

The Sketch of the Resource Room



The tools and equipment used in the RR are different from those used in other classes. There are 10 desks in total, and these are single, unlike those in the other classes. This allows lessons to be taught with students in different seating arrangements in the classroom. Education in the resource room continues four hours a week at each grade level. Here, lessons are held under the guidance of the resource room teacher. Lessons are held during school hours. In the RR, textbooks obtained within the scope of a protocol made with a private school are used. These books contain activities prepared separately for each grade level.

Participant

Students

The students participating in this study were those who continued the RR program for gifted students at school. The number of students, which was 29 when the program started, increased to 57 in the second year. Students must be identified as gifted to be accepted into practice. Students participated in this study differently and in different numbers at each stage. A focus group discussion was held with the students during the determination of the current situation of the program. Totally, eight students from different grade levels participated in this focus group discussion. In the development phase of this research, the fourth grade was chosen as the focus class.

Parents

During the research process, the opinions of the parents whose students attended the program were taken. In total, twenty-two parents participated in two focus group discussions at the beginning of the research process. In the focus group discussions, they shared their thoughts, suggestions and concerns regarding the acceptance of their students to the program.

Classroom teachers

There were twenty-six classroom teachers in the school where this research was conducted. Twenty-two teachers, whose students from their classes, went to the resource room, participated in this study. Small focus group discussions were conducted with fifteen volunteer teachers during the phase of determination of the state. Totally, twenty-two teachers participated in the coordination discussions, which are practices for the integration of the RR application into the school system, during the development phase of this research.

Resource room teacher

The RR teacher participating in this study was a classroom teacher attending a master's program in the field of gifted education. The RR teacher received various in-service training within the scope of the education of gifted children, as well as the graduate courses he attended in the field of gifted students, including the central "Resource Room Educator Training Course for the Gifted", and courses, such as "Awareness Course for Gifted Individuals and Their Education" at the local level. During the study process, the

RR teacher, who actively collaborated with the researcher, helped the researcher in planning the meetings as well as teaching the lessons in the resource room.

Researcher

The researcher is a bachelor graduate from the Department of Psychological Counselling and Guidance and has a master's degree in Gifted Education. During his education, the researcher took courses on both the education of the gifted and qualitative research and action research. He also conducted studies on the education of gifted students for eight years at UYEP, an after-school program within Anadolu University. In action research, the role of the researcher is significant because the researcher is the person who is responsible for providing change directly in the application process. In this context, the first author of this study was the person who developed the action plan and directed the application. The researcher fulfilled the processes of planning the studies, collecting and analysing and reporting data under the supervision of the second author.

School administration

One principal and two deputy principals work in the primary school where this study was conducted. During this research, the school administration assumed administrative responsibility in the implementation of the decisions taken in the development process of the RR program. They also played a facilitating role in organizing meetings with teachers and parents. The school principal also shared his views and suggestions concerning the program in individual interviews on behalf of the school administration during this research.

Validity committee

In this study, which was derived from research conducted within the scope of the doctoral thesis, a "validity committee" with four members was formed to guide the researcher in discussing the situations and the action plans to be carried out during the implementation process. One of the members of the validity committee was an academician in the field of special education and experienced in action research, and the other three members are academicians experienced in the education of the gifted.

Data Collection and Data Collection Tools

Many data collection techniques should be used to investigate the changes and developments that occur during the realization of action research and to provide data diversity (Bogdan & Biklen, 2007; Creswell, 2014). Accordingly, data were collected through interviews, documents, meeting reports, researcher diary during the research process to triangulate findings for the validity and reliability of this research.

Semi-structured individual and focus group discussions were conducted with classroom teachers, RR teacher, students, parents and school administration in the assessment and evaluation stages of this study. In addition, unstructured interviews were conducted with the RR teacher regarding the functioning in the process during the research process. These interviews lasted 22 hours and 15 minutes in total. Interviews were recorded using an audio and/or video recording device.

During the research process, along with the interviews, the notes of the teacher meeting regarding the RR program and the reports introducing the program were taken as documents to be examined from the school where the application was conducted. In addition, the meetings held with the teachers during the research process, the minutes of the validity committee and thesis monitoring meetings, the documents developed in the process and the course materials were evaluated within the scope of the document review. Finally, during the research process, the personal information form prepared by the researcher and the diaries kept by the researcher were evaluated as data collection tools.

Data Analysis

Data analysis is the process of interpreting the obtained data. In action research, data are analysed both during the process and at the end of the process (Creswell, 2014; Glesne, 2014). The data obtained in this study were evaluated both during the process and at the end of the application with the analytical analysis approach (Gurgur, 2017). During the research process, as the data were collected, they were read, monitored and summarized and descriptively analyzed. Analysis results were discussed with the validity committee. As a result of the analysis of these data, the action plans of the development phase of the research were put forward. As a result of these analyses made in the process, some actions that were not considered functional were supported by new action plans.

Six steps that Creswell (2013, p. 197) deemed appropriate for the analysis process of qualitative data were considered in the end-of-process data analysis. These steps are to prepare and organize the data for analysis, read or examine all of the data, reveal and describe themes from the data, decide how to present themes or descriptions, interpret themes and descriptions. Here, first of all, the recordings collected during the research were turned into a written document. All the data obtained from different sources in the process were classified. Written documents obtained in this process were verified by another expert. Later, all the data obtained through interviews were organized in a way to create various themes and sub-themes. Finally, all the data obtained under the supervision of the validity committee were reported under appropriate headings in the findings section.

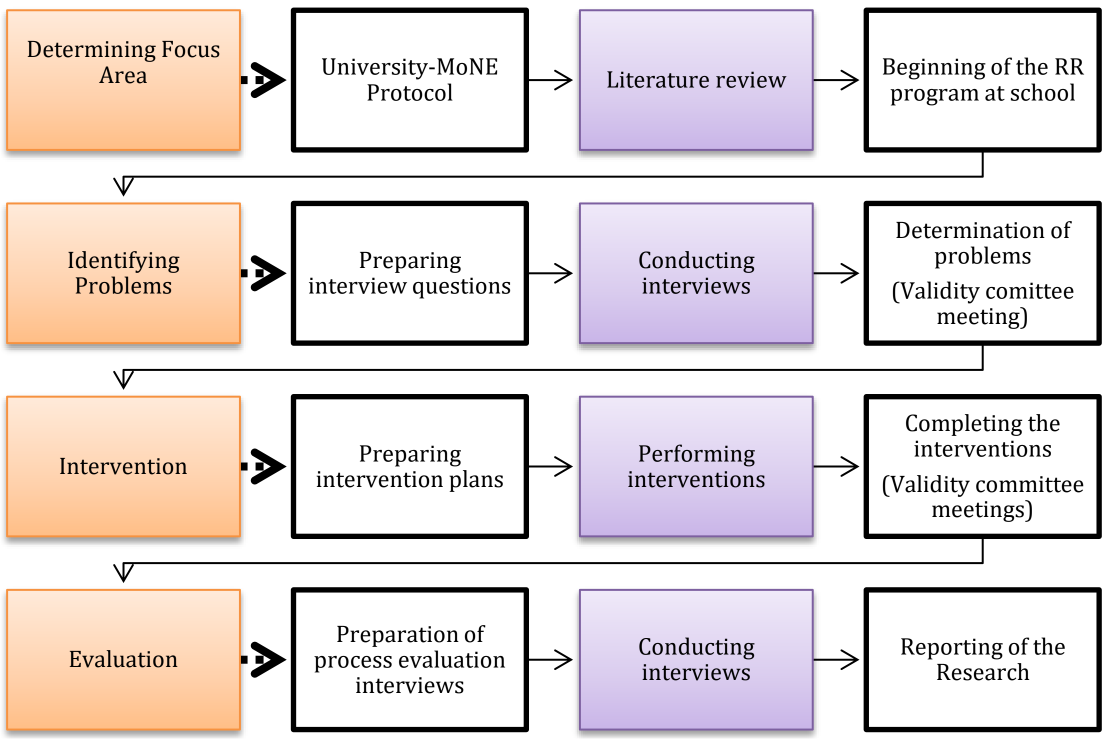
The Research Process

In general, the action research process consists of determining a subject or problem area, collecting data, analyzing data and creating an action plan (Gay, Mills & Airasian, 2012; Johnson, 2014; Yildirim & Simsek, 2016). The research cycle carried out within the framework of these steps is given in Figure 2.

As seen in Figure 2, this research was conducted in a spiral process. Firstly, the focus area was determined. Then, the current situation and problems of the program were determined. Subsequently, developmental interventions were carried out, and finally, the process was evaluated. This study was conducted based on the Protocol of Cooperation in Education between the Centre for Research and Practice on Gifted Education at Anadolu University and Tepebası District National Education Directorate. In accordance with this protocol, the RR program for gifted students in Eskisehir Tepebası Ticaret Borsası Primary School started on January 25, 2016.

Figure 2.

Summary of the Research Process



After the beginning of the 2015-2016 academic year, the researcher visited the practice school at different times and made various observations and interviews there. In the same period, he continued the literature review. In the first stage of the research, data on the physical conditions of the school and resource room were obtained through interviews and document reviews to describe the current situation and reveal the needs. At the end of this process, the main problems that needed to be addressed were identified. At the last stage of this research, action plans were developed for the problems identified in the first stage of describing the existing situation. These actions, which were implemented in the development phase and aimed mostly to make the RR application process more functional and to integrate it into the school system, were re-evaluated with the stakeholders in the process. Depending on the evaluations, new interventions were carried out instead of ineffective ones. Finally, the evaluations of the participants regarding the process were taken and reporting started.

Trustworthiness and Ethics

In qualitative research, the concept of robustness is also used instead of the concepts of reliability and validity (Gurgur, 2017). For the robustness of this study, the criteria of cogency (internal validity), transferability (external validity), consistency (internal reliability) and approvability (external reliability) were considered (Creswell, 2014; Johnson, 2014; Merriam, 2013; Miles & Huberman, 2015; Yin, 2012; Uzuner, 2005). To increase the cogency of the research process, the researcher stayed in the research environment for a long time and by using various data collection tools, data were collected long and in-depth, and detailed descriptions were made. To ensure the transferability of the research, first of all, the research process was explained in all dimensions. In this context, the school where this research was conducted, the research environment, participants, data collection tools, data analysis process and the interventions carried out were explained in detail. For consistency in this research, the methods of collecting research data should be diversified or the person or persons who provide data control apart from the researcher should be involved in the process. In this research, firstly, the research was supervised by the validity committee and thesis monitoring committee. Finally, in the context of approvability in this study, diversification in data and data collection tools were made. All data were recorded through video and/or audio recording devices. The findings obtained were verified with different data sources. In addition, the data and the findings obtained from the data were shared with the thesis advisor, the validity committee and the thesis monitoring committee members and were presented for their approval.

In this research process, attention was paid to ethical rules. During the data collection process, the aim of the research and the research process were explained to the participants and it was stated that that they were free to leave the research whenever necessary for any reason. While this research was being reported, the real names of the participants were not used; instead the abbreviations given were used: for classroom teachers CT, for resource room teacher RT, for students S, for Parents P. Participants were informed that their identities would be kept confidential and that the data obtained would only be used in scientific studies. Finally, the collected data were presented unchanged, transferred from the records as stated.

Results

In this section, the results obtained in this study are presented in themes using figures and tables in line with the research questions.

Current Situation of the RR Program

In the first stage of the research, the purpose was to determine the current situation of the RR application for gifted students initiated at school. As a result of the analysis of the data, it was found that the findings came out mostly in the form of problems (see Table 1).

One of the most striking problems was the concerns expressed by the classroom teachers in the interviews about the program's being in the school hours. The same situation was expressed by parents and students albeit for different reasons. On this subject, one of the classroom teachers says, "*It would be nice if you prepare a schedule out of our school timetable. Because there is a disjointedness from the lessons. The student goes there, goes here [...] they rupture*" (CT-1).

Table 1.

Findings Regarding the Identified Problems, Anxiety and Suggestions

Group /Themes	Problem	Anxiety	Suggestion
Teachers	• During school hours	• Disconnection in lessons, • Falling back from the lesson, • Homework burden to the student	• After school, • Afternoon, Weekend
	• Lack of coordination with the classroom	• Falling back from the lesson, • Not being aware of the subjects taught	• Facilitating coordination between RR and the classroom
	• Identification system	• The presence of successful students who could not attend the program,	• Taking teacher opinions
		• Compliance problem in the first grades	• Starting in the second term in the first grade
	• Lack of informing teachers	• Misleading due to lack of information, • Disclaiming /not embracing the program	• Informative seminars for teachers
	• Lack of informing parents	• Parent expectations are too high	• Informative seminars for parents
Parents	• Being during school hours • Lack of coordination with the classroom	• Seeing himself different from other students • Not being aware of what is being taught in the classroom	• Being out of school hours

	• Lack of informing teachers • Lack of informing parents • Continuation of the program after primary school	• Prejudice against the program • Exhibiting wrong attitude and behavior • What will the students be after primary school?	• Holding meetings with teachers • Informative seminars for parents • Planning
Students	• During school hours • Lack of coordination with the classroom	• Extra homework, • Fallback, extra homework	• Out of school hours

In case of coincidence between the RR program and the general education class (GEC) courses, teachers generally wanted students not to be taken in courses, such as mathematics, while students might be reluctant to attend the program when there are classes, such as physical education (CT-4).

Another problem expressed in parallel with the implementation of the program during school hours was the lack of coordination between the program and classroom lessons. The primary concern that came to the fore in this regard was students' falling behind GEC subjects. The resource room teacher also expressed the concerns of the students as "… What will be taught in the classroom when I go to the resource room? What practice will be done? Did they learn anything new? Am I missing these?" (RT).

Another source of concern about the lack of coordination between the RR program and classroom lessons was whether the lesson contents went parallel with each other. A teacher stated this situation with the following words, "I wish we were informed about this issue, the RR teacher does not know about us as if it were two separate things, we do not know about him, either. We need to establish a communication and a connection here" (CT-2). Another teacher said, "... we do not have an interlocutor on the subject." about their lacking information on the subject (CT-3). Concerns that their children were falling behind their classroom lessons because they attend the resource room were also expressed in the focus group meetings held by the parents of the students.

It was emerged that there were expectations for informing classroom teachers on various subjects during the RR process conducted for gifted students at school. Teachers stated that they needed information about both the program process and the education of gifted children. A teacher expressed his reproach that they were not consulted at the beginning of the program with the following words, "it is as if this program has been made in secret since last year. We were also teachers of the school, but we were not given any information. We cannot embrace it because of that attitude" (CT-3).

Relating to informing parents of students and educations for them, stakeholders emphasized the need for education, especially on how parents should treat these children. A teacher expressed that parents should be educated about gifted students with the following words; "[…] parental education is very important. All parents came and asked about the situation of their children. Everyone expects their child to be gifted" (CT-4). Similar views were also emphasized by the RR teacher and parents.

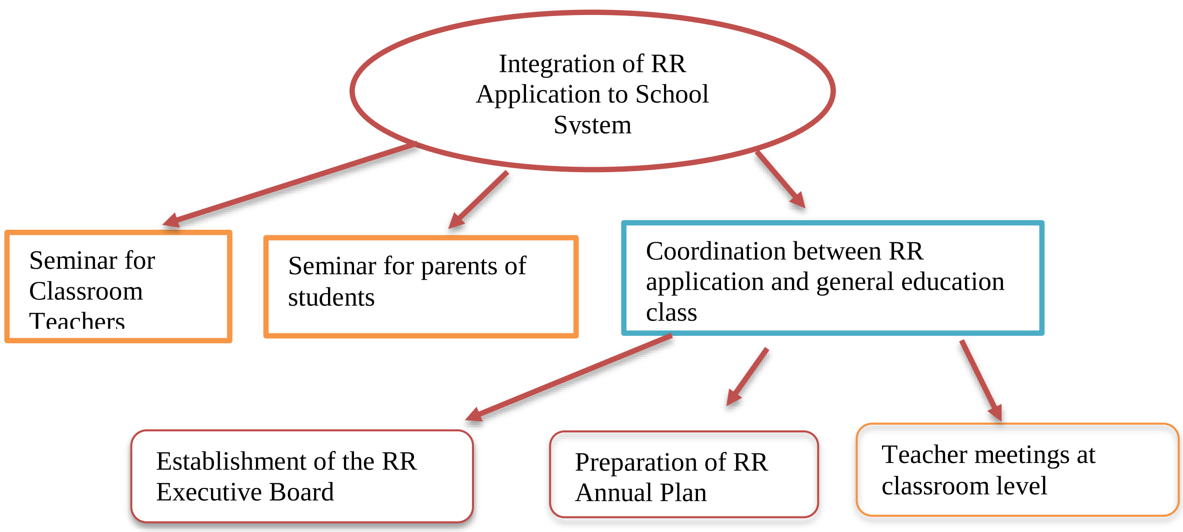
Findings obtained as a result of the interviews conducted in the current status phase of this study were evaluated in the validity committee on 07/04/2016. As a result of the evaluations made, decisions were taken related to the establishment of a board which was responsible for conducting the application in the school, to preparation of annual plans for the program and, lastly, to education for teachers and parents (Researcher diary, p. 7). The decisions taken at the meetings were shared with the school administration and the RR teacher, and some of the decisions were implemented by the school administration despite being delayed. A board named "Enriched Academic Program Executive Board" was established on 20.05.2016 to carry out the application in the school. Other planned activities were deemed suitable to be carried out in cooperation with the researcher, the RR teacher, the validity board and the school administration during the implementation of the program.

Studies on the Integration of the Resource Room Program into the School System

At this phase, various studies were conducted to increase the functionality of the program, especially in line with the problems identified at the end of the first stage. The interventions to improve the RR implementation with the decision taken at the validity committee meeting held on 07.04.2016. Development studies in the program continued until the validity meeting held on 03.05.2017.

Figure 3.

Interaction Scheme of The Studies of RR Program's Integration into the School System



To integrate the RR program into the school system, studies have been conducted under three headings (see Figure 3). These were teacher information seminars, parent information seminars, and activities carried out to provide coordination between the RR program and GEC. In this process, the main emphasized studies are the studies aimed to provide coordination with the class. The studies conducted as part of the integration of the program into the school system were not independent of each other but were carried out in a way that they supported each other.

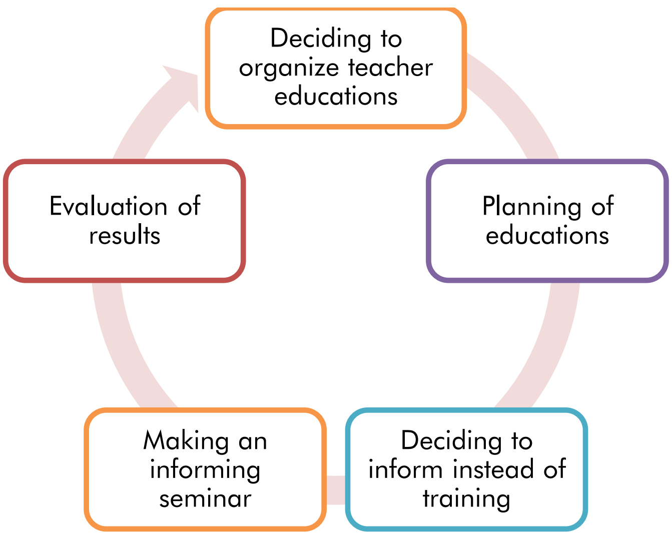
Classroom teachers' information seminar

In the interviews conducted in the current situation stage, the teachers' reproaches about the fact that they were not informed about the initiated program and that a process in which they were not involved was run in the school were determined (Committee Meeting (CM), 07.4.2016). The action cycle regarding the teacher information seminar organized within the scope of the efforts to integrate the RR program into the school system is shown in Figure 4.

The researcher had a meeting with the RR teacher at the school to discuss the date and content of the informative seminar for teachers (Researcher Diary (RD), p.15). As a result of the evaluations made, it was decided to hold the meeting on 27.10.2016 with the school administration's permission. In the process of integrating the RR program into the school system, firstly, it was planned that teachers would be trained about the strategies used in the education of gifted students and share some activities in the GEC. However, this proposal was not accepted by the validity committee due to the increase in the workload and the problems that may be experienced in ensuring teacher participation. It was deemed appropriate to hold an information seminar with the participation of all teachers working at the school. Thanks to this seminar, teachers whose students did not attend the program in their classes informed about the program and its contribution to the school. During the meeting, it was observed that teachers remain concerned about the timing of the program.

Figure 4.

Action Cycle of School Teachers' Information Seminar



Information seminar for parents of students

In the current situation stage, it was observed that the parents expressed their various concerns, although they were satisfied with their children's continuing the program (CM, 07.04.2016). Based on this, suggestions, such as sharing a topic for parents every month, establishing sharing groups and holding an informative seminar, were discussed in the validity committee meeting (CM, 26.08.2016). The validity committee decided that regular sharing groups with parents would increase the workload, and it would be sufficient to hold only an informative seminar (CM 26.08.2016). The session plan for the information seminar held for the parents of the students attending the RR is given in Table 2.

The researcher explained the reason for the seminar as meeting the parents, introducing the program and exchanging views on the implementations. The researcher informed the parents about the reports of their students and explained how they should interpret the figures in the report. Later, the parents were informed about the labelling problem encountered and preventing its negative effects on gifted students. It was evaluated that the meeting was successful in terms of informing parents and explaining the process of the program. However, it was emphasized that only various program proposals were presented to the parents' expectations related to their students' attendance to a similar program when they went to secondary school and an exact solution was not offered (CM, 03.05.2017).

Table 2.

Parents Information Seminar Session Plan

Parent information seminar	
Meeting date-duration	12.01.2017- 61′ 00′′
Meeting Venue	School Meeting Room
Materials	Camera, computer, projector
Participants	Parents of students (40), School administration (3), RR teacher, Researcher
Purpose	To inform the parents about the resource room program
Content	The reasons for organizing this seminar will be explained. The theoretical and legal bases of the program carried out in the school and the resource room will be introduced. The information will be provided about students participating in RR, how they are selected and their education. In this process, information will be given about what parents can do to reduce the negative effects of labeling. The work done to solve the problems seen in the process will be explained and finally, the parents' opinions about the program will be taken and their questions will be answered.

Efforts to Ensure Coordination between the Resource Room Program and the General Education Class

The actions for coordination between the RR program and GEC consisted of the establishment of an executive board in the school, preparation of annual plans for the program and coordination meetings with classroom teachers.

Establishment of enriched academic program executive board in the school

Since the concept of "gifted" in the name of the RR program, which is carried out for gifted students at school, may cause labelling, the name of the program was suggested to be used as "Enriched Academic Program" in the validity committee meeting (CM, 07.04.2016). This name change was considered effective by the researcher in the sense that emphasizes the academic side of the program and shows gifted students as the target group of the program (RD, p.19). In addition, it was decided to establish a board that will undertake the implementation of the program to ensure coordination between the RR and the GEC program (CM, 07.04.2016). In this board established under the name of "Enriched Academic Program Executive Board" at the school, there are totally five teachers, including a deputy school principal, a RR teacher, two guidance counselors and at least one teacher from each grade level, under the chairmanship of the school principal. Establishment of the executive committee in the teachers' meeting took part in the eighth article as follows: "It was decided to establish the Enriched Academic Program Executive Board to find more effective solutions to the situations, such as following all the processes of the project, improving its deficiencies and weaknesses, preparing resource room framework plans (Teachers' Board meeting minutes, 20.05.2016). This board could not be operated actively. However, The Executive Board has not been a stand-alone solution in solving the problems related to the coordination between the GEC and the RR Program.

Preparing an annual plan for the resource room

Students from different classes come to the RR. Therefore, lessons may not be taught in parallel in all classes. A new topic can be taught in one class while the same topic is handled a week later in another class. Due to similar situations, it was stated in various meetings that it would be appropriate to have a one-year plan of the program to ensure coordination between GEC and RR courses (CM, 07.04.2016; Teachers board meeting report, 20.05.2016).

Within the scope of the annual plan preparation work, the MoNE (Ministry of National Education) annual plans were examined and a draft plan was prepared. However, the annual plans could not be implemented efficiently due to the late announcement of the annual plans in the Ministry of National Education due to the coup attempt in the country and the difficulties arising from the institution in obtaining EEP (Enriched Education

Program) (CM 27.12.2016). Thus, the annual plan prepared in this context was not sufficient to provide coordination with classroom teachers.

Teacher meetings at the classroom level

Teacher meetings were held at the classroom level to provide coordination between GEC and the RR program. These meetings were held with the participation of the class teachers who sent students to the RR program at every grade level, as well as the RR teacher and the researcher. In this study, seven meetings were held with the classroom teachers (see Table 3).

Table 3.

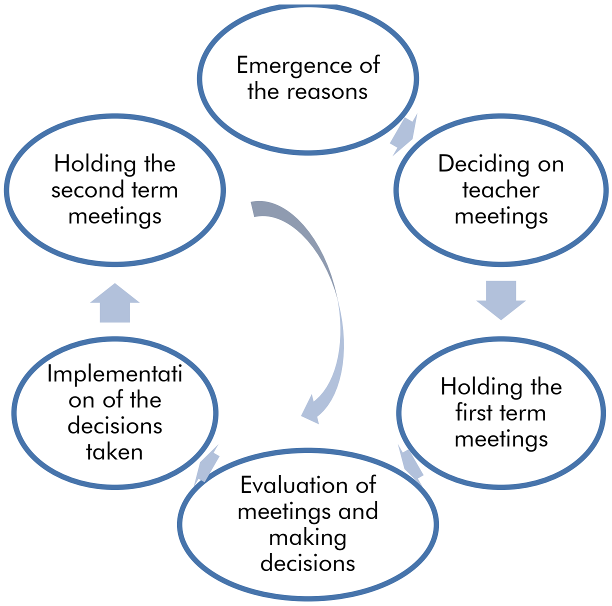
Meetings with Classroom Teachers

Meeting Number	Date	Participants	Record type	Record Duration
1	November 28, 2016	2nd-grade teachers	Camera record	14′ 29′′
2	November 30, 2016	3rd-grade teachers	Sound recording	21′ 45′′
3	December 1, 2017	4th-grade teachers	Sound recording	20′ 28′′
4	March 27, 2017	1st-grade teachers	Camera record	31′ 03′′
5	March 28, 2017	2nd-grade teachers	Camera record	22′ 32′′
6	March 30, 2017	4th-grade teachers	Camera record	15′ 48′′
7	March 31, 2017	3rd-grade teachers	Sound recording	32′ 33′′

The planning, holding and evaluation stages of these meetings held with classroom teachers spread over a long time. First of all, the problem of lack of coordination with the general education classes that emerged in the first phase of the study and the establishment of the program executive board to eliminate this problem and the failure to obtain the expected result from the annual plan preparation can be shown as the reasons for these meetings. In addition, in the information meeting held on 27/10/2016 with the participation of all teachers of the school, it was observed that the problems related to coordination still could not be solved. For these reasons, the idea of holding small group meetings with teachers was accepted in the validity committee meeting. The action cycle for the process of the teacher meetings is presented in Figure 5.

Figure 5.

Action Cycle of Coordination Meetings with Classroom Teachers



Coordination meetings were held in the resource room during the lunch break, when teachers could also participate (see Table 4). Teacher meetings held to provide coordination between the RR conducted at the school and the general education classes were evaluated in the validity committees. According to the evaluations made, the subjects taught in the RR lessons at each grade level were shared with the classroom teachers in the meetings. The opinions of the teachers related to the change in the curriculum were taken and the teachers stated that they found it positive that the lessons were collected in one day. In addition, students' attitudes and behaviours were discussed in the meetings. Teachers stated that they did not see any problems related to attendance of any of the students to RR (CM, 02.05.2017).

Table 4.

Example of Classroom Teachers Coordination Meeting Session Plan

Third grade teachers first term coordination meeting	
Meeting date-duration	30.11.2016- 21′ 45′′
Meeting Venue	Resource room
Materials	Camera, computer, Textbooks
Participants	5 third grade class teachers, RR teacher, Researcher
Purpose	To provide coordination between class and RR program
Content	Answers will be sought for questions like Which activities are covered in the RR program? What topics are taught in the classroom? Is there consistency between annual plans? Do the activities performed in the program have equivalents in the classroom curriculum? What was done in the classroom during the RR hours? In addition, information about the students attending the RR will be shared.

Discussion and Conclusion

The present study is aims determine the problems encountered in the integration of the RR program, which is organized for gifted students in a primary school, into the school system and to examine the process of solutions for them. During this research, one of the main problems that draw attention is the teachers' claims that they were not included in the preparation phase of the RR program. However, classroom teachers have an important effect on the success of the RR programs. There are studies emphasizing the participation of stakeholders in the success of programs for gifted students (Dade County Public Schools, 1983; Hong, Greene & Higgins, 2006; Gubbins, 2013; Milligan et al., 2012; Renzulli, 1987; van der Meulen et al., 2014). First of all, taking students out of their classrooms may negatively affect classroom arrangements. In addition, the manners and attitudes of classroom teachers are effective for the students who attend RR not to fall behind from their lessons and not to have difficulties when they attend the classroom lessons again. This situation requires managerial skills for a successful RR implementation. Actually, Renzulli (1987) emphasizes the importance of management activities in the success of such programs. In particular, classroom teachers, who have an important influence and role in the implementation process, should participate in the process from the very beginning while planning such programs.

During the research process, various development efforts were made to increase the acceptance of the RR program by the stakeholders. In the literature, the importance of positive acceptance of the stakeholders is emphasized in the success of such programs that affect the functioning of the school (Milligan et al., 2012; Schneider, 2006; Swanson, 2007). Particularly, teachers who send students from their classes to RR embrace and support have an important effect on the success of the application. Accordingly, two meetings were held for both teachers and parents to inform them and eliminate their concerns about the RR program. Thanks to these informative meetings, it was tried to make teachers and parents embrace this program by creating awareness that they were a part of this process.

Findings of the first phase of this study showed the basic problems as the schedule of the program, and lack of coordination with the GEC program and classroom teachers. Due to these problems, concerns that students will fall behind from their classes and that there might be disruptions in the education of the classroom have come to the fore. On the other hand, as a legal obligation, RR programs should be conducted during school hours (MoNE, 2012). Along with this obligation, the concerns expressed by the teachers about students' missing the class have parallels with the problems mentioned in the literature. In fact, different researchers (Davis, Rimm & Siegle, 2011; Morgan, 2007; Ritrievi, 1988; VanTassel-Baska, 1987) pointed to the problems of the programs on school time. On the other hand, in this study, although classroom teachers, parents and students expressed similar problems, the differences between their points of view on the problem are striking. In some studies (Campbell & Verna, 1998; Dade County Public Schools, 1983; Ritrievi, 1988), the classroom teachers complain that they cannot make regulations in their curriculum as they wish, which is similar to the problems stated by our teachers. The fact that some students from their classes go elsewhere, especially in the morning classes, prevents teachers from passing to a new subject because starting a new topic may cause difficulties in the students learning this new subject. In this case, they usually need to do extra work with their students attending the RR and re-explain the missed topics or assign homework to prevent gifted students from falling behind. As a solution to this situation, teachers advocate that the program should be conducted out of school time.

Concerns of parents about the conducting program during class hours are different from teachers' concerns. Some of the parents believe that their children attending RR will fall behind the general education class program and this will put them at a disadvantage in their exams compared to classmates. The Examination system of transition to high schools in Turkey and the importance of knowledge in this examination system can be considered to have a significant effect on parents' disquietude. On the other hand, some of the students complain that this situation reflects on them as too much homework and sometimes causes them to fall behind from the subjects in the classroom. These concerns generally coincide with the findings of the literature (Dade County Public Schools, 1983; Davison et al., 2005; Ritrievi, 1988; Morgan, 2007). Since students have to transfer what their classmates wrote to their notebooks later, especially when they are not in the classroom, they face more workload. This situation forces them to restrict the time they will spare for themselves during their extracurricular hours. To summarize, given that the RR program takes place during school time is seen as a problem among stakeholders with different responsibilities, albeit for different reasons. It is seen that being excluded by classmates (Belcastro, 1987; Davis, Rimm & Siegle, 2011; Gubbins, 2013), which is shown as an important problem regarding the RR in the literature, was not expressed by the students in this study. In fact, while the students stated that they made new friends thanks to this program, they emphasized that also they did not have any problems with their classmates too. In this context, the results of the study show parallelism with the studies conducted by van der Meulen et al. (2014), Zeidner and Schleyer (1999), Cohen et al. (1994), Delcourt et al. (2007), McCulloch (2010) and Morgan (2007).

At the second stage of this research, some solutions for the encountered problems during the program were implemented. The interventions made at this stage were aimed to integrate the RR program into the school system. The main criticisms to the program stem from its time when this study was conducted. However, in the literature, there are similar objections against pull-out programs like the lack of communication and coordination with the GEC (Naidu & Presley, 1995; Rafferty, 1996; Renzulli, 1987; VanTassel Baska, 1987; Walker, 2002), gifted students' falling behind GEC programs (Davis, Rimm & Siegle, 2011), restriction of classroom teachers (Campbell & Verna, 1998; Dade County Public Schools, 1983) and extra homework (Ritrievi, 1988). However, the main reason for the RR program is to meet the educational needs of students without leaving too much from their peers (MoNE, 2015a). In other words, it is a type of grouping recommended to reduce the possible negative effects of grouping types where gifted students receive a completely separate education. In the Special Education Regulation (2012) and in the regulation of the RR (MoNE, 2015a), which was in force at the beginning of this research, the schedule of the RR is expressed as "the supportive education services provided in the resource room should be conducted within the school's or institution's course hours (p. 3)". Thus, these regulations create a natural basis for the emergence of situations that are criticized.

During the research process, various interventions were made to provide coordination between the programs of RR and GEC. First, an executive committee has been established to be responsible for the implementation of the program at the school. It was decided to have one teacher from each grade level on this board. In addition, an annual plan has been prepared to ensure consistency between the syllabuses of them. However, both of these interventions were not sufficient to provide coordination. The reasons for the inefficacy of these two interventions in providing coordination should be evaluated within the specific conditions of the school and the period in which the study was conducted. Reasons, such as the crowded of teachers at the school and the workload of the teachers, the existence of formal procedures for the meetings prevented the executive committee from working effectively. In addition, just as the military coup attempt that occurred in Turkey in the period in which annual plans were being made and the decisions taken after that attempt affected many areas of life, it affected education order as well. Changes in the books to be used as textbooks in schools caused delays in their distribution. This situation negatively affected the annual plan preparation process in this study.

Given the findings obtained in the present study, it can be claimed that the most efficient work carried out to provide coordination between RR and general education classes is the meetings with classroom teachers. The support of classroom teachers in achieving the success of in-school education programs for gifted students is emphasized in the literature (Borland, 2013; Campbell & Verna, 1998; Davison et al., 2005; van der Meulen et al., 2014; VanTassel-Baska, 1987). In this study, class-based coordination meetings were held with classroom teachers to ensure that the classroom teachers were aware of the program process and to provide the parallelism between the program content and the general education class program. In these meetings, in addition to sharing information about the courses conducted in the RR, views on the students attending the program were exchanged with the teachers. In the meetings, generally, positive feedback was received for the development of the students and their reflections on what they learned at the RR to the classroom. These findings are in line with the research findings showing that a more qualified education process can be achieved through reflecting the education provided in the RR to the general education classes (Hoffer, 1992; van der Meulen et al., 2014; VanTassel-Baska, 2006).

In the meetings held with classroom teachers, teachers' opinions were received to provide coordination and make educational activities in both environments more efficient. In the literature, the presence of studies emphasizing the importance of teachers' participation in the process draws attention (Campbell & Verna, 1998; Davison et al., 2005; VanTassel-Baska, 2006). However, the reluctance of some teachers because of meeting times while holding the meetings made the process challenging. To overcome this problem, the researcher organized his own program according to the teachers and held the meetings in a limited time, at lunch breaks. The limited duration of the meetings obstructed making a detailed analysis of subjects. Despite these negativities, teachers find the coordination meetings were generally successful.

As can be seen in the findings, in the meetings held with classroom teachers, their suggestions were considered and decisions were made in line with their suggestions. This situation contributed to implementing the program efficiently. In the discussions about the course hours of RR program, teachers suggested that the class hours should be collected in a single day for each class instead of separate days. This proposal was accepted and implemented in the next academic year. With this suggestion, teachers argued that they would make lesson planning in their own classrooms more efficiently. This decision has been seen as influential both for involving teachers in the RR process and for making the program more functional.

The implemented decisions related to the RR reveal the significance of effective interventions made within the school facilities. However, it should be noted that the school administration had an important effect on the implementation of this decision regarding the change of course hours. In fact, the importance of school administrations' taking an active role in the success of RR programs is emphasized in the literature (Long, Barnett & Rogers, 2015; Milligan et al., 2012; Westberg & Archambault, 1997). Although the school is a primary school, there are teachers who come from other schools for some lessons, such as English and Music. This situation may cause difficulties in organizing and making changes in the course schedule. Despite these difficulties, the school management made the necessary changes in the weekly course schedules due to the importance it attaches to the RR program. This situation actually shows the effectiveness and crucially of local dynamics in the process of the decisions making and implementation. This intervention may not be applied in another school, where it will be more difficult to change such schedule hours, although it is found efficient and applicable in this study. From this point of view, it would be beneficial to provide school administrations with various intervention opportunities within the conditions of the schools.

As a result, in this research process, which was carried out to examine the process of integrating the RR program into the school system for gifted students in a primary school, various problems were determined, and actions were taken to solve them. In this context, it can be concluded that most of the problems have been solved by the effective implementations. During the research process, it is observed that the most remarkable problem is related to the schedule of the program. Efforts were made to provide coordination with classroom teachers to overcome these problems. As a result of the research, it can be inferred that it is significant to ensure cooperation and consensus between stakeholders for effective RR programs.

Based on the research findings, some recommendations can be presented for practitioners and researchers. Firstly, it can be said that the deficiencies of the official Resource Room Guide should be eliminated. A detailed guide, which is different from other special education groups, can be prepared for gifted students. Additionally, in the guide, it may be suggested to remove the restriction in group education, which is limited to three people, to provide flexibility concerning number and provide flexibility in the arrangement of weekly course hours. Furthermore, it can be suggested that the education for gifted students in RR programs should be related to education models for gifted students based on current scientific knowledge. In such a guide, it can be argued that standards for education to be carried out in RR should also be set. Standards for programs can be adjusted on the basis of those relevant to the educational program standards of gifted students developed by the United States National Association for Gifted Children (NAGC, 2010). It is considered that the problems related to the course hours of the RR program and its coordination with GEC, which come to the fore as the main problem in the research, are administrative problems. In this context, it may be suggested to establish a board at the school level that will carry out the process to prevent similar problems. Moreover, it may be suggested to hold regular meetings with teachers who send students from their classes to the RR program. These meetings may be held respectively at each grade level to discuss the development of the students as well as the courses taught at RR and to provide coordination with the general education class. In accordance with the findings obtained at the end of the research, it is thought that different studies are needed on RR programs for gifted students. First of all, this research was conducted in a RR applied at the primary school level. Similarly, it may be suggested to examine the RR programs implemented in different institutions and education levels in the form of action research or case study, so unique and different scientific contributions can be made related to the different educational environments and educational levels. In this research, more focus has been placed on administrative regulations. It is recommended to conduct studies on the reflections of the RR implementations on the general education class, such as the attitudes and behaviours of the classmates of gifted students who attend the RR; how the classroom environment affected by the absence of the students who attend RR can be discussed within this scope. Thanks to these studies, it is thought that more concrete information about the effects of RR programs on general education class atmosphere will be reached.

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