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Editor
Abdullah KUZU

Guest Editor
Şengül S. Anagün

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Contact Address:
Prof.Dr. Abdullah KUZU
TOJQI, Editor in Chief
Izmir-Turkey

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For all enquiries regarding the TOJQI, please contact Prof.Dr. Abdullah KUZU, Editor-In-Chief, TOJQI, Izmir Democracy University, Faculty of Economics and Administrative Sciences, Department of Management Information Systems, 35140, Karabağlar, Izmir, Turkey.
Phone #:+90-232-2601001, Fax # :+90-232-2601004.
E-mail : abdullah.kuzu@idu.edu.tr; editor@tojqi.net.

Message from the Guest Editor

Dear Colleagues,

I am honored to have been invited to be the guest editor-in-chief of this issue. This issue includes seven papers by authors from various universities in the field of education. It is a great honor for me to introduce these studies in the field of qualitative research area.

This issue covers various fields and focuses on the latest research findings in related areas, such as STEM education, education management, teacher training programmes and foreign language teaching. Two of the articles were designed with phenomenology, two with case studies, two with qualitative research and one with integrative evaluation approaches.

In this issue, I would like to express my special thanks to Abdullah KUZU, the journal editor, for giving me the opportunity to be a guest editor. Special thanks are also due to Ahmet Oğuz AKÇAY for his dedicated efforts, courteous help, and his continued commitment to scientific excellence. I hope this issue contributes to qulitative research area.

Best wishes

Prof.Dr. Şengül S. ANAGÜN

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Research Article

Elementary School Students Designing Engineering-Based Rube Goldberg Machine Projects: A Case Study

Engin Karahan[1], Ahmet Oğuz Akçay[2], Ceren Tiftikçi[3]

Abstract

The literature highlights the importance of engineering design processes for bringing students in interdisciplinary knowledge and skills. Considering the potential of designing Rube Goldberg Machines in STEM education, this study aims to portray the experiences of fourth grade students designing Rube Goldberg machines in an after-school program for six weeks. A single case study design that approaches an analysis unit holistically was employed. The participants of the study are four fourth grade students (a design team with three female and one male students). The data collection tools were semi-structured interviews and participant observation. The analysis of the data were done via content analysis by creating categories and then themes. The themes that emerged based on the data analysis were design process, use of disciplinary knowledge, use of skills, difficulties faced, problem solving, teamwork cooperation and communication, the comparison between project design and classroom practices, learning, and the role of educator. The findings of the study illustrated the design process and the knowledge and skills they obtained from their own perspectives.

Keywords: *STEM education, Rube Goldberg machines, case study.*

[1] Assistant Professor, Eskişehir Osmangazi University, Faculty of Education, Educational Sciences, karahan@umn.edu, https://orcid.org/0000-0003-4530-211X

[2] Assistant Professor, Eskişehir Osmangazi University, Faculty of Education, Primary Education, oguzakcay42@gmail.com, https://orcid.org/0000-0003-2109-976X

[3] Undergraduate Student, Eskişehir Osmangazi University, Faculty of Education, Mathematics and Science Education, cerentiftikci@gmail.com, https://orcid.org/0000-0002-6354-8845

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İlkokul Öğrencilerinin Mühendislik Tasarım Odaklı Rube Goldberg Makineleri Tasarımları: Bir Durum Çalışması

Öz

Eğitim alanında gerçekleştirilen çalışmalar mühendislik tasarım süreçlerinin disiplinlerarası bilgi ve becerilerin öğrencilere kazandırılması açısından öneminin altını çizmektedir. Rube Goldberg Makineleri tasarımının STEM eğitimi ve mühendislik tasarımı noktasındaki potansiyelinden yola çıkılarak, bu çalışma kapsamında ilkokul 4. sınıf öğrencilerinin okul dışı etkinlikler kapsamında altı hafta boyunca Rube Goldberg Makinesi tasarımı sürecindeki deneyimlerinin ve edinimlerinin ortaya konulması amaçlanmaktadır. Bu doğrultuda tek bir analiz biriminin (ilköğretim dördüncü sınıf öğrencilerinin oluşturduğu tasarım ekibi) kapsamlı bir biçimde ele alındığı bütüncül tek durum deseni temel alınarak çalışma yürütülmüştür. Araştırmanın çalışma grubunu bir devlet okulunda dördüncü sınıf düzeyinde öğrenim gören dört öğrenci (3 kız 1 erkek) oluşturmaktadır. Veri toplama araçlarını yarı-yapılandırılmış görüşmeler ve katılımcı gözlemleri oluşturmaktadır. Verilerin analizinde, birbirine benzeyen verilerin belirli kavramlar ve temalar çerçevesinde bir araya getirilerek yorumlanmasını amaçlayan içerik analizi yöntemi uygulanmıştır. Verilerin analizi neticesinde ortaya çıkan kodlar: tasarım süreci, disipliner bilgilerin kullanımı, beceri kullanımı, karşılaşılan güçlükler, problem çözme, ekip çalışması işbirliği ve iletişim, proje süreci ve sınıf içi uygulamaların karşılaştırılması, öğrenme ve eğitmenin rolüdür. Çalışmanın bulguları öğrencilerin gözünden tasarım sürecini ve bu süreçte kazandıklarını düşündükleri bilgi ve becerileri ortaya koymuştur.

Anahtar Sözcükler: *STEM eğitimi, Rube Goldberg makineleri, durum çalışması.*

Introduction

STEM Education

Being rapidly changing and an undeniable part of education, technology is included in the curriculum and strategy documents of countries. In this way, students are taught about 21st century technologies, and attempts are made to ensure awareness of innovations occurring in technology and engineering (Azgın & Şenler, 2019). Based on the first letters of science, technology, engineering and mathematics, STEM education is a current approach based on teaching that brings students' knowledge and skills in these areas together and targets the use of abstract knowledge in real world contexts. Especially at the K-12 level, mathematics and sciences are taught as independent disciplines in formal learning environments. However, though these disciplines integrate with technology at a basic level, the relationship with the field of engineering is mostly not explained (Öner & Capraro, 2016). Though all science and mathematics topics are not appropriate to form interdisciplinary connections, there is great potential to create connections between the four disciplines in an integrated structure due to the nature of STEM education (İnce, Mısır, Küpeli, & Fırat, 2018). STEM education "has the properties of being an educational approach that aims to apply theoretical knowledge, transforming it into products and innovative inventions; ensuring students see the knowledge learned in lessons as part of a whole, and included on the curriculum of many countries around the world" (Ministry of National Education [MEB], 2016).

STEM education may be implemented by integration of science, technology, engineering and mathematics disciplines with equal weight or by taking one of these disciplines as center and creating connections with the other STEM disciplines. Studies in the relevant literature show that STEM education targets the development and gain of higher-level cognitive skills in students (Özyurt, Kayıran, & Başaran, 2018). STEM education ensures students learn from real world problems and can solve the problems that will be encountered in the future, obtain knowledge in more holistic and planned manner, transfer the knowledge learned to different disciplines and complete production and outcomes using skills specific to different fields at an early age (Aydın, Saka, & Guzey, 2017). Among the basic targets of the STEM approach is that students gain 21st century skills by increasing their interest and orientation toward the

science, technology, engineering and mathematic disciplines. Though 21st century skills have many definitions, they basically comprise "living and occupational skills", "learning and renewal skills" and "information, media and technology skills" (Partnership for 21st Century Skills, 2009). In other words, STEM education ensures the gain and development of many skills like students' confidence in themselves, problem-solving, gaining life experience, being innovative, communication, creativity, intellectual curiosity, critical thinking, information and media literacy, cooperation and team work, and self-direction and social responsibility (Morrison, 2006; Aydın, Saka, & Guzey, 2017; Partnership for 21st Century Skills, 2009).

Research by Pekbay (2017) concluded that STEM activities were effective in increasing students' interest in STEM fields. Within the scope of this study, STEM was described as "students focused on concepts like inventing, discovering, combining, constructing, developing ideas, creativity, innovation, development of countries and intercountry competition were identified to have more sophisticated opinions related to STEM after the application compared to before the application" (Pekbay, 2017). Similarly, Şahin (2013) stated that students' interest in STEM fields increased with participation in STEM activities related to real life. It is considered that students with learning experiences based on STEM education are individuals who can solve problems, are innovative, have high self-confidence, think logically, and are science and mathematics literate, in addition to reaching capacity in careers related to the science fields (Bahar, Yener, Yılmaz, Emen, & Gürer, 2018).

Engineering Design

Scientists in the process of understanding and discovering nature, the main theme of the sciences, benefit from products designed by engineers and achieved by using technology; similarly, engineers use the scientific principles discovered by scientists when making designs and are aided by technology in removing obstacles to design. Current research has revealed the need for science education, including many disciplines within its nature and based on research/questioning, enriched with engineering design approaches (Topalsan, 2018). "Acting as a bridge between engineering, science and mathematics-based theories and technology used, with the aim of resolving social requirements, and acting to integrate scientific principles and mathematical theories, it is emphasized that engineering design-based approaches have great importance for the development of science education" (Bahar et al., 2018).

The engineering process may be defined as having knowledge, using this knowledge to design new things, understanding how these designed objects work and making this design appropriate for others (Brophy, Klein, Portsmore, & Rogers, 2008). As engineering is directly related to real situations and social processes, at its foundation it is based on common work by a group of people in the name of solving personal and social problems (Marulcu & Sungur, 2013). Engineering design activities develop students' independent, reflective and metacognitive thinking skills and ensures they gain qualities by learning from experiences and mistakes within this process, and considering uncertainty, risk and safety factors (Moore, Glancy, Tank, Kersten, & Smith, 2014). Engineering design applications in the context of STEM education integrate knowledge and skills in the STEM field with interdisciplinary approaches based on students' problem-solving ideas for real life problems (Bybee, 2010; Guzey, Tank, Wang, Roehrig, & Moore, 2014).

However, traditional classroom applications may not always fully allow gain of skills targeted by completing STEM-focused engineering design activities due to physical conditions and curriculum structures in schools (Roberts, 2012; Bybee, 2010). As a result, a significant portion of STEM-focused activities appear to be completed in extracurricular environments (Davis and Hardin, 2013; Hesser and Schwartz, 2013; Bevan, Gutwill, Petrich, & Wilkinson, 2014). Hence, the process based on operation of complicated mechanisms to achieve simple tasks of Rube Goldberg machines provides the opportunity to use interdisciplinary knowledge and skills through developing problem-solving-focused projects and has great potential to achieve the targets of the STEM education approach (Ambrose & Sternberg, 2016). These machines ensure students develop unique engineering designs (Acharya & Sirinterlikci, 2010; O'Bryne et al., 2018; Marklin, 2018).

Similarly, Rube Goldberg machines not only integrate STEM concepts, they also require students to creatively develop machine designs (O'Byrne et al., 2018). Rube Goldberg (1883-1970), in addition to being an engineer, was also a popular Pulitzer prize-winning caricaturist known for strange inventions. In addition to being known for his caricatures, he designed machines completing simple tasks with a range of complicated steps and gave these machines the name "Rube Goldberg machine". A Rube Goldberg machine (RGM) is a complicated structure using a chain reaction to complete a simple task. To create RGM, students must not only use knowledge accumulated about disciplines like science, mathematics and engineering, they must also have competencies like humor and story-telling. Marklin (2018) stated that Rube

Goldberg machines were not just drawings, they also revealed innovative engineering designs, while Acharya and Sirinterlikci (2010) stated Rube Goldberg machines used engineering designs. Kim and Park (2012) stated that Rube Goldberg machines supported the development of positive attitudes to science among students. As a result, it is considered possible to use Rube Goldberg machines for students to gain STEM knowledge and skills and to inform them about engineering.

Based on the potential for design of Rube Goldberg machines at the juncture of STEM education and engineering design, this study aimed to reveal the experiences of 4th grade students during a six-week Rube Goldberg machine design process completed in the scope of extracurricular activities. Thus, in depth investigation of the design process for Rube Goldberg machines in terms of both learning outputs and explaining the thinking and experiences of students during this process was ensured.

Method

The aim of the study is to reveal the experiences and gains of fourth-grade primary school students during the design process for STEM-focused Rube Goldberg machines. As a result, a case study design, based on in depth "how" and "why" questions and allowing investigation of a case or event not controlled by the researcher was used (Yıldırım & Şimşek, 2011). In line with this, the study was completed on a single analysis unit (design team formed of fourth-grade primary school students) comprehensively dealt with in a holistic single case pattern.

Participants

The study group in this research comprised four students attending fourth-grade level in a public school (3 girls, 1 boy). Within the scope of the STEM club, with voluntary participation of students after school, they worked on the Rube Goldberg Machine design process for six weeks. Three of the students were in the same class, while one was in a different class.

The first participant, Gökhan, though a very problematic student in terms of distraction and self-confidence, came to the fore with the ability to find rapid and practical solutions to problems. Able to criticize his own performance, Gökhan was delayed in catching up with the

remainder of the group when completing group work. Another participant, Melike, chose to work as a team instead of individually during group work and was a student able to lead the group. Coming to the fore among her friends due to problem-solving skills, she occasionally displayed panic behavior due to her excitable nature. The third participant, Ceylan, was shy; however, she effectively completed cooperative work during group studies. She chose to act slowly and deliberately during the process of solving problems in general. Finally, Hacer came to the fore among her friends due to esthetic perceptions and high manual skills. She was able to find more than one solution during problem-solving but had a tendency to dominate the problem-solving process.

Design Process

The aim with the design process was to develop thinking skills of students like critical thinking, creativity, innovativeness and problem-solving, as well as making this process an entertaining alternative learning activity. Participating students used their STEM understanding to define the problem and worked in line with the plan prepared by developing solution proposals in this process. During the six-week design process, the skills gained by the students, things noted during the design processes, how they completed team work, and what knowledge and skills were used were investigated by communication with the teachers.

At the end of the process, students were expected to complete the final step of opening a flag with the desired machine created in 6 steps. These steps are the transfer of energy from one action to another. For example, a sequence of dominos hitting each other is 1 (one) step. One hundred dominos falling is a repeated situation at the heart of Rube Goldberg machines and counts as a single step. Table 1 shows the design process.

Table 1

Design Process

1st week	General information about RGM, question-answer and planning of student designs (drawings)
2nd week	Bringing materials and beginning project design
3rd, 4th and 5th weeks	Continuation of project design
6th week	Completion and presentation of project design

In the first week of the process, participants were given general information about RGM by the researchers and shown examples. Within the scope of the information, the properties required by the RGM nature were mentioned, what the number of steps are, the importance of valid energy transfer for the number of steps, in other words the trigger factor, what type of materials will be used (recycling or easily obtained material), and what the target of the design was (opening a flag) were explained in detail. Student questions were answered and misunderstood sections were explained in detail and then students created sketch drawings when planning their designs. In the 2nd week, students brought material to be used in line with their plans and began to create the mechanism. In the 3rd, 4th and 5th weeks, students continued to create their designs, and replaced missing or nonfunctional materials with more appropriate ones to ease operation of the mechanism. During these three weeks, steps planned in the first week but not operational during the design process were updated and work continued. In the 6th week, students completed the mechanism, made it operational and presented it to their friends.

Data Collection Tools

In qualitative research, data obtained from different sources like observations and interviews are analyzed, synthesized and interpreted (Yıldırım & Şimşek, 2011). The data collection tools in this research comprised semi-structured interviews and participant observations. Interviews target the determination of experiences of participants and how these experiences are shaped. In this study, semi-structured interviews with individual participants targeted their perspectives about the experiences and outcomes they gained during the process. In addition to interviews, the researchers were in continuous interaction with the participants during the process and described their experiences with a participatory observer role.

Data Analysis

Analysis of data in this study brought similar data together in the framework of certain concepts and themes and applied a content analysis method targeting interpretation. In this process, categories and themes revealed by coding of data were used to interpret data. The coding process for data was separately completed by three researchers, then combined and consistency between coders was ensured. Additionally, the interview and observation data were examined

to see if they supported each other, in order to increase the validity and reliability of the research (Yıldırım & Şimşek, 2011).

Results

With the aim of communicating the experiences and gains of participants during the RGM design process, the responses to semi-structured interview questions and findings from the researchers' observations were first coded, then sorted into categories, and finally used to build themes. Some responses of the students to questions during the interview were included in more than one code. The themes are shown on Figure 1. Categories are also presented within the themes.

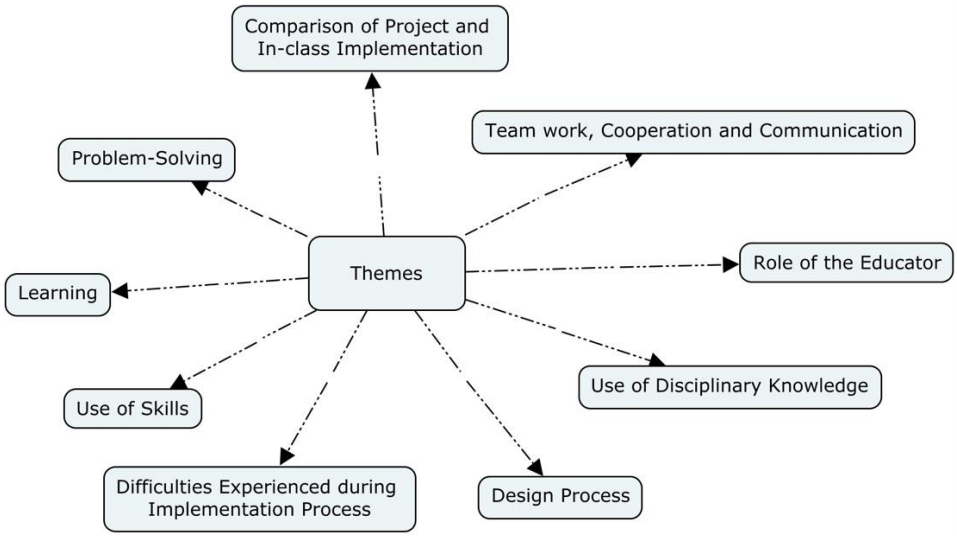

Figure 1. Basic Themes Revealed by the Analysis

Design Process

Categories included in the theme of "design process" are *ingroup decision making, compliance with sketch drawings, developing their own material and learning from errors*. The students developed sketch drawings of the machines at the start of the process and progressed through the process in line with the general lines of these drawings. However, material representing a problem in their developed mechanism was exchanged with more efficiently operating material through problem-solving. In short, while remaining true to the design plan developed at the

start of the process, they exchanged problematic pieces. For example, the first design attempted did not allow sufficient car energy transfer, so a heavier car was found and the problem was solved within the same sketch plan. In the following example, Gökhan explains improving the design with material exchange.

> *"First of all, we made mistakes. We designed thinking how we could make it work. Then as we didn't have sponge (recycled polymeric material) we tried to widen some areas. Then when we widened it too much, the marble fell through the center of the sponge. Later we fixed the sponge as we had it at first. Then we used a cardboard cup the same as in our drawing. Then it worked." (Interview- Gökhan)*

Additionally, along with remaining loyal to the sketch drawing, material that did not fully operate in the mechanism was exchanged with similar but deeper operating material and they developed their own materials.

> *"Design material was determined by the students using material they didn't use brought from home. Some material was designed with their families in order to make it more appropriate for use." (Observation note)*

During the interviews with students, they stated that their imagination had developed throughout the process and they could do better drawings than at the beginning. Additionally, it was observed that participants made consensus decisions with ingroup discussions during the design process.

> *"The four friends state their own ideas, and after a brainstorming session, they apply the most logical idea." (Observation note)*

Use of Disciplinary Knowledge

Weight and force concepts, thrust, force-energy relationship, control of energy transfer, stating and solving problems, and use of nonstandard measurement devices are categories within the "use of disciplinary knowledge" theme. Students stated they used information from different disciplines during the process of creating the mechanism. They used concepts and knowledge included in science and mathematics lessons especially. To operate the mechanisms correctly without errors, they used knowledge about weight, velocity, force, thrust, and energy, in addition to problem statement and solving skills frequently encountered in social science

lessons to solve problems during the process. For example, the participant Hacer said they used knowledge learned in science lessons.

> *"We used weight and force terms. For example, when trying to find the answers to questions like; will that lift the weight? Will that force push that object? We used what we learned in lessons." (Interview-Hacer)*

Additionally, in line with data obtained as a result of observations, the students show how the rectangular shape of Jenga pieces allowed them to fall in regular fashion. The students expended efforts to place them at equal intervals to ensure the step continued and were observed to use the nonstandard measurement tool of fingers to determine the distance between the Jenga pieces.

> *"In this mechanism where energy transfer is most important, students corrected mistakes related to energy transfer in each step because they could not always change the material." (Observation note)*

Use of Skills

Categories included in the "use of skills" theme were *thinking skills, manual skills, problem-solving skills, communication and cooperation skills, creativity and inability to associate with skills*. For students to operate the mechanism in regular manner during the process, they stated they frequently used manual skills. The observation note given below reveals the manual skills developed by students during the process.

> *"At the start of the process, when students attempted to insert pieces of the mechanism, it caused the other pieces not to work. Over time, with the development of hand skills during the process they succeeded in building the mechanism without errors." (Observation note)*

During the process it was observed that students' awareness and sufficiency levels about skills were insufficient. For example, one of the students considering her skills insufficient said to her friends during the design process *in fact my manual skills are good, I just noticed (observation note)* and to the researcher during the semi-structured interview *"my manual skills were poor, I gained more manual skills" (Interview-Melike).*

Additionally, as they used teamwork within the scope of RGM design, they used communication and cooperation skills and found the most appropriate solution for problems encountered by discussion. The participant Melike expressed her thoughts *"I learned the skill of being a team with my friends, of sharing ideas" (Interview-Melike).*

In addition to all of this, participants emphasized the development of design skills during the process, and that if they entered the design process again they would make better designs.

> *"After students built the mechanism, they became aware of what RGM are and what type of RGM they could make. If they did it again, they stated they would make different steps." (Observation note)*

Difficulties Experienced during Implementation Process

Problems during step transfers, clarification of RGM steps and attention errors are categories under the "difficulties experienced during the implementation process" theme. Students experienced difficulty with the step transfers due to the setup of the material used and inappropriate steps. For example, among difficulties experienced when building the mechanism, due to the marble used for step transfer being too small, the car in the next step didn't move.

> *"They think they can reach a conclusion by only thinking once about the error in a step. Then they repeat that step maybe 10 times and realize they can solve the problem." (Observation note)*

Additionally, students think about one step as two or three steps and experienced difficulty when calculating the numbers of steps in the mechanism. For example, they calculated every block the marble knocks as a step; however, they ignored the need to transfer energy from one action to another in order to count as a step. In other words, students could not calculate a repeated situation as a single step.

> *"Due to the lack of clarity about what steps are in the RGM setup, within the group they could not determine the number of steps and energy transfer." (Observation note)*

Problem-Solving

Trial and error, problem solving by discussion, mentor support, determination of the most appropriate solution and *focused problem-solving* are categories within the "problem-solving" theme. Instead of finding a single solution to problems encountered, the participants stated they developed more than one solution and determined the most appropriate solution by trial and error and then applied it. For solution to problems encountered at the beginning of the process, students all talked at once without listening to each other's ideas, and they made more errors as everyone wanted to apply their own ideas. In the advanced stage of the process, they began to listen to each other and stated they used brainstorming to reduce errors to a minimum and shorten the solution process for problems.

> *"Sometimes at solution points we had discussions like "this should be like that". But we combined our ideas and all of us solved the problem." (Interview-Hacer)*

Additionally, when students could not produce a solution, they chose trial and error and stated they solved the problem in this way. The participant Gökhan expressed his thoughts about the problem-solving process with trial and error in the advancing stage of the process.

> *"Firstly, we found the problem by trying over and over. Then we saw where we made the mistake. We corrected the mistake by thinking, seeing and trying." (Interview-Gökhan)*

More than one participant stating their opinion sometimes made it difficult for students to focus on the design. This situation presented an obstacle to solving problems encountered. In the advancing process, they gained the competency to find the solution by focusing on the problem.

> *"No matter how many changes they make to the mistaken location, when they see the RGM mechanism still does not open the flag they find the error they have focused on is not the mistake and the error is in a different part of the mechanism." (Observation note)*

Additionally, in situations where they could not find a solution through trial and error, they said they applied for mentor assistance.

> *"Firstly, I talked to my friends, and I tried to solve the problem by discussion. If I couldn't solve it, I went to the teacher." (Interview-Hacer)*

> *"I gave the students a long time to find their mistake, sometimes half an hour sometimes longer. When students could not find a solution in any way, they received support from me." (Observation note)*

Team work, Cooperation and Communication

Communication problems, cooperative problem-solving, solving disputes by consensus, sharing responsibility and duty, and listening and applying ideas are categories included under the "teamwork, cooperation and communication" theme. At the beginning of the process, students experienced disagreements about what the steps of the mechanism should be and which material they should use. In later stages, they observed that disagreements were an obstacle to their progression. As a result, they reached solutions through discussions and consensus.

> *"Sometimes I had problems. I couldn't do some things. Our cooperation was good. My communication was not very good." (Interview-Gökhan)*

> *"Though group members experienced communication problems at the start, the need for cooperation began to resolve communication problems" (Observation note)*

Additionally, they shared duties in order to continue the process more effectively and correctly. For example, instead of one person providing materials, they talked and decided that everyone should bring what material they had. In another instance, as two students were in the same class and another was their friend, the remaining student was observed to experience communication problems. At the start of the process, the other students did not listen to this student's ideas and this caused communication problems between the group members. However, in the advanced stages of the process, the group adapted to the unintegrated student and they maintained the process in healthier fashion.

> *"At the beginning, the group leader displayed dominant attitudes in solving problems. Later when the solution ideas of a passive student were found to work, the whole group began to determine problems and find common solutions" (Observation note)*

Comparison of Project and In-class Implementation

Similarity to class experiments, direct experience of the student, richer experience compared to in-class implementation, more opportunity for cooperative work, regular completion each week, and *three-dimensions studies focused on experience different from books* are categories under the theme of "comparison of project and in-class implementation". Under this theme, students mostly emphasized being active within the process. Classes are crowded for experiments and activities and due to lack of time, they mentioned they could not fully complete experiments in the class environment.

> *"In school lessons there are these types of experiments in the science book. There are similar ones. But they are experiments we don't do. RGM was different. We did it ourselves." (Interview-Melike)*

> *"For example, in class when we do experiment type things the class is very crowded so we don't fully do them. Everyone says different things and we don't do it. With the people in STEM club I can do it more comfortably and quickly." (Interview-Ceylan)*

As stated by the student, because the classes are crowded during experiments and activities, students are not individually active and the teacher cannot pay much attention to students individually. As the design teams within the scope of this study contains 4-5 people, the mentors were able to pay more and better attention to students individually and students have the opportunity to discover for themselves better in this way. Additionally, participants revealed that learning experiences with more concrete materials instead of written texts in lessons was a positive factor affecting their learning experience.

> *"Differently, this time there was no test or book, we began to do things based more on manual skills. We made the three-dimensional reality" (Interview-Gökhan)*

Learning

Project design and development, slope-velocity relationship and *sloped plane system* were categories under the "learning" theme. During interviews with students when giving responses to questions about what they learned, they emphasized project design and development.

Students who don't have the opportunity to work on projects during formal education processes stated *designing and developing a project from the start (Interview-Ceylan)* came to the fore when asked questions about what they learned in relation to the process. As a result, participants mentioned that they obtained the necessary skills for project design during this process.

Another important point revealed in the learning theme is that students had the opportunity to learn some content and skills not included on the curriculum at their grade level through observation and experience. For example, by trial and error at the point of moving objects in the mechanism, they were observed to discover the correlation between slope and velocity.

> *"Attempts were made to control velocity increases due to the steep slope after trials and in this way students discovered the relationship between slope-velocity." (Observation note)*

In addition to the slope-velocity relationship, the students were observed to learn concepts they did not know before the process like sloped plane system, friction force and energy transfer.

Role of the Educator

Categories included in the "role of the educator" theme are *supporting with clues, correcting mistakes, undertaking the teacher's role, gaining awareness of problems* and *awareness of mistakes*. Students encountered problems at times during the process of creating the mechanism and they experienced difficulties solving these problems. The educators came into play and made the students aware of where they were making mistakes, and showed the students how to find possible solution routes by giving clues. The aim here was to allow the students to become aware of the problem and correct their mistakes rather than directly giving them a solution. Additionally, students gave the educator the role of teacher during the process. The participant Hacer expressed her thoughts as follows.

> *"I saw you as a teacher. You helped use to correct our mistakes." (Interview-Hacer)*

The educator working one on one with the participant group occasionally asked them open-ended questions in order to make the participants aware of their mistakes. However, as much opportunity as possible was given during this process, with support given only at the last point.

> *"I gave the students a long time to find their mistake, sometimes half an hour sometimes longer. When students could not find a solution in anyway, they received support from me." (Observation note)*

Discussion and Conclusion

The results of the analysis of data collected from fourth grade primary school students about the STEM-focused Rube Goldberg machine design process aimed to reveal the experiences and gains of these students. The findings of the study revealed the design process from the student's point of view and the knowledge and skills that students considered themselves to have gained from the design process.

Deveci (2019) emphasized the importance of researching the efficacy of Rube Goldberg machines in scientific concepts. The results of semi-structured interviews and observations completed within the scope of the research observed that participants learned science and mathematics concepts on the primary curriculum better and gained awareness of knowledge at upper teaching levels. Studies in the literature underline that engineering design processes target transformation of knowledge into learning and applications (Brophy, Klein, Portsmore, & Rogers, 2008), in addition to the development of upper-level cognition skills (Özyurt, Kayıran, & Başaran, 2018). The findings of this study support these arguments showing that students transformed knowledge and skills specific to science and mathematics disciplines, especially, in the design process and had high awareness of the process. The participants discovered concepts and relationships included in higher class outcomes through observation and experimentation and were revealed to have self-awareness about this learning process.

Another important point revealed in the research findings is the change in the cooperation-based teamwork skills of participants during the design process. Studies in the relevant literature about Rube Goldberg machines show students experienced problems with team work and management during this design process (Jordan & Pereira, 2009; Mahinroosta; & Lindsay, 2016). Participants experiencing problems at the point of decision making and sharing

responsibility in the process contributed more to efficient cooperative processes as the project advanced. Students stating their learning experiences in the RGM design process were different to those in classroom environment during the semi-structured interviews emphasized that they had more opportunity for cooperative work during the design process compared to in-class implementations. As a result, the problems experienced by students who were not used to teamwork at the beginning of the process are normal and the experience gained during the process appeared to positively contribute to skills like cooperation, teamwork, and responsibility. With an important place in 21st century skills and among the outcomes targeted with the STEM education approach (Morrison, 2006; Aydın, Saka, & Guzey, 2017; Partnership for 21st Century Skills, 2009), these skills were revealed in the scope of the research both in participant statements during semi-structured interviews and during observations completed during the research.

Risk and uncertainty factors in the concept of engineering make it necessary for students to learn from their mistakes and previous experience during the engineering design process (Moore et al., 2014). Engineering-based cognition skills are accepted as an important marker of the ability to learn from mistakes (National Research Council [NRC], 2009). During the study, though participants made mistakes several times, they solved these mistakes through decisions made as individuals and as a team. The results of interviews completed within the scope of the study observed participants became aware of mistakes made during the process and obtained skills like developing more effective designs and problem-solving to correct them. Additionally, they learned the transformation of basic scientific and mathematical concepts into applications with the RGM mechanism through trial and error. As a result, as stated in the NRC report, participants made progress on the topic of learning from mistakes, an important dimension of engineering-based cognition skills, during the process.

One of the basic philosophies of Rube Goldberg machines is that students involved in the design process use simple materials from daily life. The interview and observation data collected within the scope of this study show that students obtained all material used in the design process by recycling objects that were not used in their homes. In this way, arguments emphasized in the relevant literature about the learning activities encouraging individualized learning and strengthening the bonds between school and home were revealed (Song, 2016). Specific to Rube Goldberg machines, they are considered to provide the opportunity to create individually-meaningful design fields without requiring the use of developed technologies

within the structure of the machines (Deveci, 2019). In this context, participants in the study used their own material for their designed RGM projects contributing to more individual and meaningful design and learning experiences.

Specific to STEM education, engineering applications target practical development about solving personal and social problems by students (Bybee, 2010; Guzey, Tank, Wang, Roehrig, & Moore, 2014; Marulcu & Sungur, 2013). Within the scope of this aim, interviews and observation data obtained from participants in this study revealed the positive development of problem-solving skills. While participants listed problem-solving at the top of the list of skills gained, observations revealed the participants used different strategies for problem-solving. Considering the complicated structure of RGM design, participants encountered problems with different types and levels and had the opportunity to produce solutions to these problems.

In this study, a design process independent of outcomes was completed through extracurricular activities. Though this process did not involve concerns about curriculum outcomes, within the process, the students displayed gains included in the primary school science and mathematics lesson curriculums and obtained upper-class outcomes too. Based on this, design activities not directly related to curriculum gains assessed in the free structure of extracurricular environments may be associated with knowledge and skills required by students. In addition, it allowed the possibility to gain awareness about upper-class outcomes.

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Appendix 1. Themes and Categories

Theme	Categories
Design Process	Abiding by sketch drawings Bringing their own material In-group decision making Learning from mistakes
Use of Disciplinary Knowledge	Weight and force concepts Thrust force Force-energy relationship Control of energy transfer Problem statements and solving Use of nonstandard measurement tools
Use of Skills	Cognition skills, Lack of association with skills Manual skills Problem-solving skills Communication and cooperation skills Creativity
Difficulties during Implementation	Problems experienced during step transfers Inability to clarify RGM steps Difficulties due to attention errors
Problem Solving	Problem-solving with trial and error Problem-solving by discussion Mentor support Determining most appropriate solution Focused problem-solving
Team work, Cooperation and Communication	Communication problems Cooperative problem-solving Solution by consensus in discussions Sharing responsibilities and duties Listening and applying ideas
Comparison of Project and In-class Implementation	Similarity to in-class experiments (direct experience of the student) Richer experiences compared to in-class implementations Possibility for more cooperative work Completion of each week regularly Three dimensional, experienced-focused work, different from books
Learning	Project design and development Slope velocity relationship Slope plane system
Role of the Educator	Supporting with clues Correcting mistakes Undertaking the role of teacher Providing awareness of problems Making them aware of errors

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Research Article

Opinions of Scholars on the 2018 Social Studies Teacher Training Program[1]

Hilal Şarpal[2], İsmail Acun[3]

Abstract

The aim of the research was to investigate the 2018 social studies teacher training curriculum and evaluate it within the framework of lecturers' opinions. This research employs a qualitative research approach. Within the scope of this research, documents related to the topic were investigated and semi-structured interviews were held with participants attending workshops during the development process of the revised program with the aim of confirming data obtained from the documents. Questions related to problems in the data obtained from documents and interviews were analyzed with descriptive and content analysis techniques together to obtain answers. The research findings revealed the changes to the revised social studies teacher training program curriculum encompass only the content dimension in the program development process. Data obtained from interviews with lecturers contributing to the preparation of the curriculum support this finding. This study reveals that the difficulties that occurs during implementation of old curriculum will persist during the implementation process for the 2018 social studies teacher training program.

Keywords: *Social studies teaching, social studies, program assessment, curriculum*

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[2] Graduate Student, egitim.hilal@gmail.com, https://orcid.org/0000-0002-0011-2657

[3] Assoc. Prof. Dr., Usak University, Faculty of Education, Department of Social Studies Education, ismail.acun@usak.edu.tr, https://orcid.org/0000-0003-1248-1836

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2018 Yılı Sosyal Bilgiler Öğretmenliği Öğretim Programı Hakkında Öğretim Üyelerinin Görüşleri

Öz

Bu araştırmanın amacı, 2018 yılı sosyal bilgiler öğretmenliği öğretim programını incelemek ve öğretim üyelerinin görüşleri çerçevesinde değerlendirmektir. 2018 yılı sosyal bilgiler öğretmenliği öğretim programının incelendiği bu araştırma da nitel araştırma yöntemi kullanılmıştır. Bu araştırma kapsamında konu ile ilgili dokümanlar incelenmiş ve dokümanlardan elde edilen verilerin teyit edilmesi amacıyla güncellenen programın geliştirilme sürecinde yapılan çalıştaylara katılarak görüş bildiren katılımcılarla yarı yapılandırılmış görüşmeler gerçekleştirilmiştir. Dokümanlardan ve görüşmelerden elde edilen veriler problem durumunda yer alan sorulara cevap alınacak şekilde betimsel ve içerik analizi tekniklerinin birlikte kullanılmasıyla çözümlenmiştir. Araştırma bulguları, güncellenen sosyal bilgiler öğretmenliği öğretim programında yapılan değişikliklerin, program geliştirme süreçlerinin bir boyutu olan içerik boyutunu kapsadığını ortaya koymaktadır. Programın hazırlanmasına katkı sağlayan öğretim üyeleriyle yapılan görüşmelerden elde edilen veriler de bu bulguyu destekler niteliktedir. Bu çalışma, kuramsal olarak zengin bir içeriğe sahip gibi görünen 2018 yılı sosyal bilgiler öğretmenliği öğretim programının uygulanma sürecinde var olan aksaklıkların devam edeceğini ortaya koymaktadır.

***Anahtar Sözcükler*:** *Sosyal bilgiler öğretmenliği, sosyal bilgiler, program değerlendirme, öğretim programı*

Introduction

Operation of the educational system as desired is linked to students, teachers and the curriculum being compatible (Şimşek, 2017). The "teachers" can be said to be the most important element of the education system as it is their duty to cultivate students compatible with the curriculum (Azar, 2011). Training teachers with qualities to ensure completion of the curriculum targets is a topic of sensitive focus for all countries (Çelikten, Şanal, & Yeni, 2005). This situation has led to a variety of reorganizations of teacher training programs from the past to the present (Akdemir, 2013).

MoNE (MEB) Social Studies Curriculum

In Turkey, "history", "geography" and "civic education" were taught as separate subjects from 1926 to 1962 and then combined under the name "society and country investigations" in 1962. From this date, though social studies was sometimes used in the country, the term studies appeared officially in 1968. From 1975, social studies began to be used in all middle schools and in 1985 it was split into 3 separate subjects of "national history", "national geography" and "citizenship education". In 1997 the "national history" and "national geography" subjects were removed from the curriculum, and in 1998 they were placed in the social studies curriculum encompassing 4^{th} and 7^{th} grades (Kılınçkaya, 2018).

In 2004, the aims of the social studies were dealt with in two tiers; as universal and national targets. Students gaining competence in a variety of social studies areas like history, geography, economy and sociology are among the universal aims of the program ensuring continuation of society (Öztürk, 2012). National aims somehow different from universal aims also aims to re-cultivation and continuations of the society. Social studies plays a crucial role in terms of ensuring students know their basic rights and duties as democratic individuals and can make correct decisions based on common sense when they encounter problems (Akdağ, 2008).

Based on the constructivist approach, in 2004 the aim of the social studies curriculum was not to load students with information but for them to gain the skill of being able to produce information (Artvinli, 2010). Skills are the individual's expected ability to transfer

attainments and gains from the learning process into their own lives (İnci, 2009). Attainment of skills determined in the curriculum by students is the duty of the teacher (Hayırsever, 2010). In the social studies curriculum, it appears the skills that students are expected to attain are clearly stated (Kabapınar, 2014).

One of the targets of the social studies is to contribute to the students' moral development and positively shape their character. This situation can only occur with good values education (Akbaş, 2008). For individuals to effectively take their place in society and to display attitudes sensitive to the expectations of society, the importance of values education is great (Özdaş, 2013). For students to attain the values included on the curriculum, it is necessary for schools and families to cooperate (Acun, Yücel, Önder, & Tarman, 2013).

Social Studies Teacher Competencies

The competencies of teachers to be able to carry out their duties and responsibilities in their professional field are the knowledge, skills and values (Gökçe, 1999). A teacher's possession of these competencies is linked to the quality of education that they received in the teacher training institutions (Kutluca, Birgin, & Çatlıoğlu, 2007).

Before social studies teachers begin a lesson, first they have to plan the lesson in advance. It is beneficial to the learning and teaching processes that lessons are operate with a plan. The expected behavior from a qualified teacher is that before lessons they organize to lesson from the aspect of examples to be given in lessons, information to be presented and activities to be carried out (Kızıltepe, 2002). Teachers should be able to effectively manage the learning and teaching processes (Öztürk, 2009). A rote education carried out in teacher training institutions and/or by the social studies teachers themselves ends up not being able to teach necessary skills to the students. The fact that social studies teachers may not have encountered the activities required to be implemented during lessons in the preservice period may represent a problem in terms of operating the learning and teaching processes (Korkmaz, 2009).

Education is the process of realizing the expected change in the behavior of the individual. Control of this process is through determining the success, measurement and evaluation of the students in terms of the behavior change expected (Şenyurt, 2016). A variety of measurement and evaluation techniques are used while attaining the knowledge, skills and values included

on the social studies curriculum. During social studies lesson teaching a great care should be taken that the measurement and evaluation approach adopted for this lesson take note of individual differences, considering that every individual has different levels of learning knowledge, implementing skills and obtaining values (İnci, 2009).

In the learning process, the effects of the family, school and environment on the student are immense. The most important thing is that school and family act in cooperation (Gülcan & Taner, 2011). With regard to cooperation between school, family and society, the teacher's leadership qualities come to the fore. The teacher should be in a guiding position within the school and class. In fact, one of the teacher's duties is to enlighten society. For this, the teacher should be someone with exemplary characteristics and should guide those around them (Çelikten, Şanal; & Yeni, 2005).

Teachers' attitudes toward their profession affect their professional success, just as they have an important place in education and teaching activities (Can, 2013). However, a teacher who knows and loves his/her profession will expend efforts to ensure personal and professional development. Social studies teachers should follow developments in their own field and be open to innovative ideas. At the same time, teachers should attend conferences and seminars to develop themselves and contribute to development of their field. With the aim of contributing to developments in the field, teachers are expected to research at academic level and should know at least one foreign language to the level of speaking and writing (MEB, 2017).

Teacher Training in Turkey

Since the 1800s, teaching has been accepted as a profession in many countries. In our country, the teacher training tradition extends to the Ottoman period (Çelik & Gündoğdu, 2007). In 1840, it was decided that teachers needed to undergo special education in order to perform the requirements of the profession. In line with this aim, schools to train teachers were opened in 1848. The first teaching school opened by the Ottomans with the aim of training teachers was 'darülmuallimin' (Duman, 2009).

Since the Republican period, significant developments were experienced in the education and teaching system (Kavcar, 2002). In 1940, Village Institutes "Köy Enstitüleri" with an

important place in development of society in terms of economic, cultural and social aspects were opened. The Village Institutes, with contributions not just to training teachers but also to training other professional personnel, were abolished in 1954 (Kartal, 2008). In 1974, all teaching schools were combined under the name "teaching high schools" (Saç, 2016). Until 1982, teachers were trained under the guidance of the Ministry of National Education (MEB). From this date, the responsibility of training teachers passed to universities (Yılmaz, 2005). Since the 1990s, many studies have been performed to improve the teacher training system (Koçak & Kavak, 2014).

In recent years in Turkey, comprehensive changes were made to teacher training programs twice. The first of these changes was restructuring of faculties of education in 1997 due to problems in teacher training implementation continuing until 1996 (Azar, 2011). The second change occurred with the reorganization of teacher training programs in 2006-2007 due to changes made to the teacher training program in 1997 being seen as insufficient (Demir, 2012). The most recent update to teacher training programs occurred in 2018 with the aim of training teachers in accordance with the requirements of the current age. This study was completed on the revised social studies teacher training program curriculum. The results of this research are considered to illuminate future studies to be performed about the social studies teacher training curriculum. The reason for this is the continuity involved in the need to update teacher curricula in accordance with the requirements of the modern era.

To understand how and in what ways the social studies teacher training program was revised in 2018 changed compared to the previous curriculum, the answers to the following questions were sought during this research;

- When evaluated with the established curriculum development and evaluation practices, how is the new social studies teacher training program?
- What are the similarities and differences between the 2018 social studies teacher training program and the previous one?
- What is the education and teaching process envisaged by the 2018 social studies teacher training program?
- What is the measurement and evaluation process envisaged in the 2018 social studies teacher training program?

- In terms of competencies of preservice teachers for lessons, to what extent is the 2018 social studies teacher training program associated with topics in the primary and middle school social studies lessons?
- To what extent do lessons included on the 2018 social studies teachers training curriculum fulfill the competencies envisaged in the framework of social studies teachers' competencies?

Method

Research Design

A qualitative research approach was used in this research. Qualitative research is a research type using techniques like observation, interviews and document analysis with the aim of collecting in-depth information about a topic (Yıldırım, 1999). In this research, interviews were held with experts and the 2018 social studies teacher training program curriculum was investigated in light of data obtained from the interviews.

Participants

The study group in this research comprised of 11 lecturers contributing to preparation of the 2018 social studies teacher training curriculum. Information about the demographic characteristics of the lecturers are given in Table 1.

Table 1

Demographic Characteristics of Lecture Staff

	Sex	Title	Organization
LS1	Female	Professor	Central Anatolia
LS 2	Female	Associate Professor	Central Anatolia
LS 3	Male	Professor	Central Anatolia
LS 4	Male	Professor	Central Anatolia
LS 5	Male	Doctor Lecturer	Central Anatolia
LS 6	Male	Professor	Marmara
LS 7	Male	Associate Professor	Aegean
LS 8	Male	Associate Professor	Mediterranean
LS 9	Male	Associate Professor	Black Sea
LS 10	Male	Associate Professor	Central Anatolia
LS 11	Male	Professor	Mediterranean

In this research, with the purpose of collecting the necessary, data, criterion sampling method was chosen. In this method used in qualitative research, the researcher may choose a sample to study of anyone who is appropriate for the research topic (Koçak & Arun, 2006). In line with the aims, the selection criteria for participants were;

- Working in a social studies teacher training department,
- Having professional experience to evaluate both the old and new curricula,
- Participating in at least one of the preparation studies for the 2018 curriculum.

Additionally, lecturers who specialized in separate branches that were close to social studies, like history education or geography education, and who worked as administrators in education faculties or education science institutes were accepted as advantageous in terms of variety.

Data Collection Tools

The data sources in this research were documents and data obtained from semi-structured interviews. Within this framework, with the aim of investigating the 2018 social studies teacher training program documents belonging to old and new curricula were investigated within the framework of teacher competencies and semi-structured interviews were held with lecturers who contributed to preparation of the curriculum. Questions on the interview form were prepared by the researcher in such a way as to answer the research questions. For the validity of the questions, 3 experts including an associate professor in the social studies education field, a doctor lecturer in the education curriculum and teaching field, and a professor in the education management field evaluated the questions before they were given their final form.

The interview form included 13 questions to collect information about the philosophy, aim, education and teaching process, and measurement and assessment process forming the basis of the curriculum development process. Scholars who participated in the curriculum development process were asked questions such as what the philosophy of the curriculum is, and what is vision of the program the education and teaching process.

Research Process

The researcher collected data during one-to-one interviews by going to the organization where the lecturers were employed or through social media. The interview durations varied from 30 to 60 minutes. Interviews were recorded with a voice recording device and transcribed. Participants voluntarily participated in the research and the responses that participants gave to questions asked in the interview were kept anonymous due to ethical considirations. As a result, the names of the lecture staff in the study were coded as "*LS1, LS2, LS3, LS4, LS5, LS6, LS7, LS8, LS9, LS10* and *LS11*".

Data Analysis

Data obtained about the revised curriculum were descriptively investigated to answer research questions of the study based on the Taba-Tyler model used for curriculum development and investigation processes. During analysis of data, very rich content was reached from data obtained in interviews, especially. In the second stage of data analysis, it was decided that the use of content analysis would be more appropriate. According to Patton and Silverman, the process targeting revelations about the relationship of data obtained in research with each other is called content analysis (cited from 2005, Çelik, 2011). Transcripts were read within this framework and open codes were created. These codes were compared with codes and categories used in descriptive analysis. Additionally, for suitability of codes and categories, they were evaluated for whether there was consensus between coders or not (inter-rater reliability was not calculated using a formula). In the final stage, data were analyzed according to both the determined theoretical framework (e.g., Taba-Tyler model, basic concepts in competency framework) and the codes and categories obtained from data.

Results

In this section, the study findings are given in light of codes created based on data obtained from document analysis and interviews with lecturers participating in the curriculum development process with the aim of investigating the 2018 social studies teacher training program. Analyses in this section are based 'the teacher competencies' and 'middle school social studies curricula' documents of the Council of Higher Education (YÖK 2018) and

MEB (2018) and (2017) respectively. The documents will be not cited and referred as the documents hereafter.

Findings About the Development Process for the 2018 Social Studies Teacher Training Program

Based on data obtained from interviews with lecturers, the codes of 'analysis of needs', 'planning', 'data-based', 'stakeholder opinions', 'scientific', 'pilot implementation' and 'evaluation' were created under the category of 'curriculum development processes'.

Lecturers were observed to report that sufficient analysis of needs was not performed during preparation of the social studies teacher training curriculum, as a result there was no information about whether the curriculum required an update and they had doubts that the revised program would correct problematic aspects of the old program. In terms of representing the opinions of participants related to this topic, the opinions of participant coded LS9 were as follows;

> *"When evaluating the curriculum, analysis of needs of all stakeholders in Turkey should be performed, with opinions obtained but these opinions don't have to be given in workshops all the time and not every province has a workshop, there are different methods. This analysis needs to be performed really well. This analysis was not done well, deficiencies in the curriculum were not identified well and because they were not identified well, I think this curriculum is not at the level to meet the requirements." (LS9, 14'20")*

Lecturers participating in the curriculum development process stated more than one meeting was held in the curriculum development process and that different opinions were used. However, lecturers attending these meetings saw a problem due to not being able to participate in later meetings. The reason for this problem was seen to be due to different lecturers working on the same text in every meeting. In terms of representing the opinions of participants about this topic, LS6 participant expressed the following views;

> *"Different teams worked on the same text. As a result, this was a good thing from one aspect because different opinions were obtained, but on the other hand we encountered this one of the meetings I attended, we couldn't understand the earlier logic and because we didn't know some things seemed really strange to us. There was no chance to discuss it." (LS6, 00'44")*

The curriculum development process beginning with identification of needs should then have pilot implementation studies performed to check the changes to the curriculum and evaluate the results obtained (Demirel, 2007). One lecturer drew attention to the implementation and evaluation stages of the revised social studies teacher training curriculum development process;

> *"I think curriculum development studies were not very sufficient. Also, instead of immediately implementing the developed curriculum performing a pilot implementation trying it in a few universities is needed to measure the outcomes. There was no such pilot study performed" (LS2, 03'31").*

Based on this opinion, though lecturers know that pilot studies are an important stage in the curriculum development process, it was concluded that sufficient importance was not attached to this stage in the social social studies teacher training curriculum development process.

Findings About Similarities and Differences Between the 2018 Social Studies Teacher Training Program Curriculum with Previous One

When the revised social studies teacher training curriculum is investigated, it appears only lesson titles and contents were included. With the aim of being able to investigate the content of the 2018 social studies teacher training curriculum, when analyzing data in the 'content' category the following codes were created; 'name changes', 'removed from curriculum', 'credit changes', 'added to curriculum', 'elective lessons' and 'applied lessons'.

Table 2

Findings about Lessons in the Social Studies Teacher Training Curriculum

Type of lesson	Lessons removed from curriculum	Lesson credit	Lesson semester
Area training	Archeology	T+2	I.
	Sociology	T+2	I.
	Social Psychology	T+2	I.
	Ancient History and Civilizations	T+2	II.
	Philosophy	T+2	II.
	Economics	T+2	II.
	Basic Law	T+2	III.
	Art and Esthetic	T+2	III.
	Geography of Countries	T+2	V.
	Contemporary World History	T+2	VI.
	Human relationships and	T+2	VI.

	communication		
	Current World Problems	T+2	VII.
	Social Project Development	T+2	VIII.
Occupational knowledge	School Experience	T+U+5	VII.
	Curriculum Development	T+2	VII.

As seen on Table 2, one lecturer stated this opinion in relation to lessons removed from the social studies teacher training curriculum;

> *"The content doesn't reflect lessons in our field. For example, law and economy lessons were removed, there's no sociology or philosophy lessons but they've been changed to education philosophy and education sociology." (LS1, 10'22").*

One lecturer stated the following in relation to the removal of the "geography of countries" lesson;

> *"For example, geography of countries was removed. I cannot understand this; in other words, just when we need a global view of the world." (LS10, 09'07").*

In relation to the removal of the 'school experience' lesson from the curriculum, one lecturer expressed the following idea;

> *"I think there should be a lesson like school experience in the 1st semester. I see that as a deficiency. For one thing, you need to get to know the profession. In 1st year you should get to know the profession. If the student isn't able to do it, they need to get out of the system immediately." (LS5, 07'50").*

Table 3

Findings About Lessons with Credit Changes on the Social Studies Teacher Training Curriculum

Type of lesson	Lesson Name	Previous credit	New credit
Area Education	General Physical Geography	4	2
	General Human and Economic Geography	4	2
	History of the Middle Ages	4	2
General culture	Foreign Language	3	2
	Turkish Language	2	3
	Information Technologies	4	3
Occupational knowledge	Introduction to Education	3	2

	Education Psychology	3	2
	Teaching Principles and Methods	3	2
	Measurement and Assessment in Education	3	2
	Guidance in Schools	3	2

As seen on Table 3, one lecturer stated the following in relation to lessons with credit changes on the revised program;

> *"It is not possible to explain a general physical geography lesson in two hours. Explaining this much content in that many hours, I have a problem in relation to what we will explain. Because we have the habit of four hours of lessons. The same thing is valid for the general human geography lesson, it's lowered to two hours and explaining this will be very difficult again" (LS3, 03'20").*

Table 4

Findings About Lessons Added to the Social Studies Teacher Training Curriculum

Type of lesson	Lessons added to curriculum	Lesson credit	Lesson semester
Area Education	Learning and Teaching Approaches in Social Studies	T+2	III.
	History of First Turkish Islamic States	T+2	III.
	Social Studies Curricula	T+2	IV.
	Disasters and Disaster Management	T+2	VII.
	Art and Museum Education	T+2	VII.
	Media Literacy and Education	T+2	VII.
	Character and Values Education	T+2	VIII.
Occupational Knowledge	Education Sociology	T+2	II.
	Education Philosophy	T+2	II.
	Morals and Ethics in Education	T+2	VI.

As seen in Table 4, a lecturer made the following statement about lessons added to the revised program;

> *"You can't change very much by adding a lesson, firstly we need teachers who understand the lesson, who conceptualize it, know it and can teach it. We added the lesson, but how many people can teach this lesson. We have 60 social studies education departments. But how many lecturers can give a lesson called disaster education, similar for media literacy." (LS4, 24'26")*

Table 5

Findings About Elective Lessons Added in Place of Lessons Removed from the Social Studies Teacher Training Curriculum

Lesson removed from curriculum	Elective lessons added to curriculum	Type of lesson added
Economics	Economy and Innovation	General Culture
Human relationships and communication	Human Relationships and Communication	General Culture
Art and Esthetic	Art and Esthetic	General Culture
Current World Problems	Current World Problems	Area Education
Drama	Drama in Social Studies Teaching	Area Education
Curriculum Development	Curriculum Development in Education	Area Education
Basic Law	Turkish Legal System	Area Education

As given in Table 5, a lecturer stated the following in relation to the inclusion of previously mandatory lessons in the elective lesson group on the revised curriculum;

> *"In other words, lessons like art and esthetic, current world problems, it's right they are elective according to me, but I don't think that about this drama lesson. It's like this, the teaching profession is a stage art you see and the lesson where we can learn information about stage art is drama, according to me." (LS5, 11'41")*

Based on this opinion, it can be concluded that lecturers negatively evaluated the removal of the drama lesson from the curriculum.

Findings About Education and Teaching Processes in 2018 Social Studies Teacher Training Curriculum

When the revised social studies teacher training curriculum is investigated, there appears to be no information about how the education and teaching processes should be implemented. Based on data obtained from interviews with lecture staff who worked on the preparation of the social studies teacher training curriculum, codes and categories were created as shown in Figure 1.

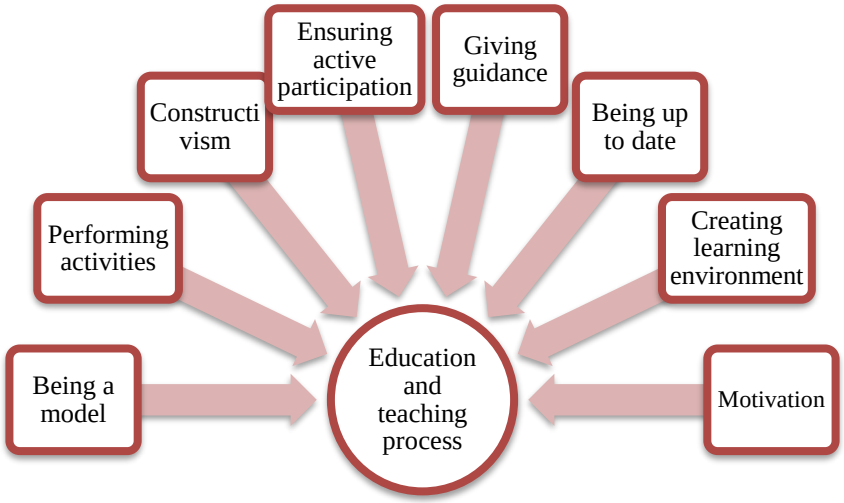

Figure 1. Codes Linked to "Education and Teaching Process" Category

Participants appeared to consider that as the 2004 social studies curricula were based on a constructivist teaching model, the education and teaching process in the social studies teacher training curriculum should include lessons operating in accordance with the constructivist teaching model. However, from responses given by lecturers to the interview questions it is understood that the constructivist teaching model was not realized in the implementation process for the curriculum. A lecturer stated the following in relation to this situation;

> *"The basic problem for preservice teachers is this, they told me one day; you want constructivist but we didn't see that in university. In other words, how can we apply something we haven't seen. As a result, if we complete activities with a constructivist approach in lessons here, maybe we can implement it." (LS2, 18'40")*

Another situation affecting learning and teaching processes is the motivation of preservice teachers. Students with high motivation are more interested in learning compared to students with low motivation. Students with low motivation may also experience failure (Akbaba, 2006). Lecturers who worked on the social studies teacher training curriculum stated that the motivation of preservice teachers was low and as a result they were not interested in learning. One lecturer stated the following opinion in relation to this situation;

> *"We're not very good; in other words, we cannot give students high levels of knowledge, skills and equipment. Why can't we do this, students come all excited in 1st year, in 2nd year they become aware of the situation, and in 3rd they're finished. They say; we came here but there's so many preservice teachers. If we can't be teachers, what will come from learning." (LS3, 34'48")*

To train highly skilled teachers during their preservice training, it is necessary that lecturers *guide* preservice teachers in the education and teaching process. In relation to this topic, participant coded LS5 stated the following which represents the opinions of the participants;

> *"Students come to learn something from you. They need your guidance. For 4 years before coming to every lesson I work. I feel I have to work over and over and I try to keep up to date." (LS5, 14'13")*

Based on this opinion, it can be said that some lecturers try to act as mentors for preservice teachers in the education and teaching process.

In relation to how the education and teaching process should operate in the curriculum, participant coded LS1 stated the following opinion;

> *"Firstly, we need to be models. Teaching through modeling forms the basis of many concepts in fact. Whatever kind of teacher we want the preservice teachers to be in class, whether applying student-centered activities, developing material, being a constructivist teacher, including families in the process, implementing a variety of activities, having good communication, whatever kind of preservice teacher we want, we have to be that kind of teacher ourselves and we have to organize that kind of teaching environment." (LS1, 12'51")*

Based on this opinion, it is understood that lecturers giving lessons about management of education and teaching processes have important responsibilities.

Findings Related to Measurement and Assessment in the 2018 Social Studies Teacher Training Curriculum

When the 2018 social studies teacher training curriculum is investigated, it appears there is no information about measurement and evaluation processes. A lecturer stated the following in relation to this situation;

> *"As the curriculum doesn't have a process dimension; in other words, taking a trip is left to the teacher's initiative, their conscience, bring them or not, if they do, they do it themselves. If they don't go, neither they nor the students go. I think the process will be affected completely by the teacher's qualities. Just looking at the lesson names or short content, we cannot say that the trained teacher will be this or that." (LS1, 20'57")*

As a result, it is concluded that rather than the structure of the revised curriculum affecting the quality of the preservice teachers at graduation, the quality of the lecturers giving the lessons will be an important factor.

Findings about the relationship among 2018 social studies teacher training curriculum and topics in primary and middle school social studies curricula

With the aim of determining findings about the relationship among the 2018 social studies teacher training curriculum and topics included in primary and middle school social studies curricula, the learning areas included on the social studies were coded as categories, while lesson content on the social studies teacher training curriculum associated with outcomes in these learning areas were coded linked to these categories.

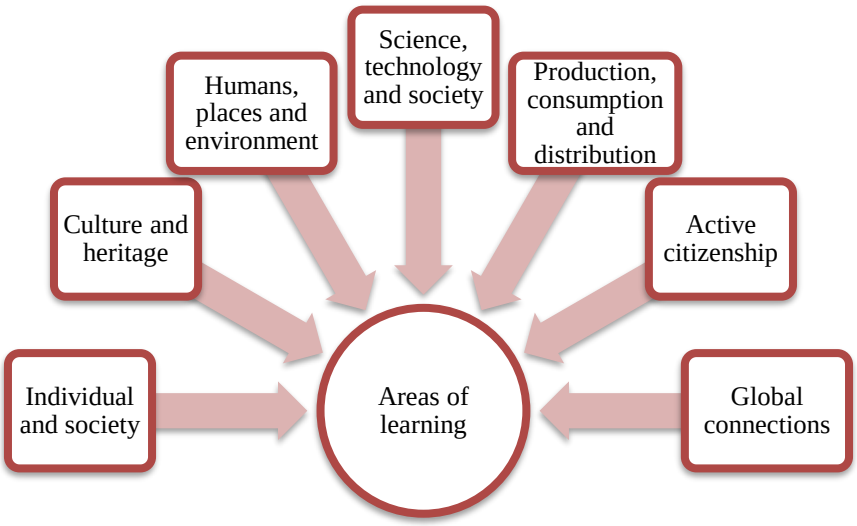

Figure 2. Subcategories Linked to the "Areas of Learning" Category

The subcategories linked to the 'learning areas' category are shown in Figure 2. With the removal of some education lessons which were mandatory in the 2006 curriculum, a lecturer considered this caused incompatibility with the MEB school curriculum;

> *"The teaching curriculum and the areas on the social studies education curriculum should overlap. In this sense, teachers who will teach the 4th, 5th, 6th and 7th class social studies, who will apply these, should take all lessons required by that curriculum. The removal of these, it's a bit like, I think it's a deficiency." (LS2, 06'04")*

Based on data obtained from interviews, lecturers included in the curriculum development process are understood to think the compliance between the MEB curriculum and the teacher training curriculum was not sufficiently examined. A lecturer who though this stated;

> *"In other words, we change the teacher training curriculum but the teachers we will train or do train, we don't look at the compatibility between changes to the curriculum the teachers will have to teach and our curriculum. That was not examined at all for example." (LS4, 22'59")*

Table 5

Findings Related to Association of Learning Areas with Undergraduate Lessons

Individual and Society	Culture and Heritage	Humans, places and Environments	Science, technology and society	Production, consumption and distribution	Active Citizenship	Global Connections
Social Studies Teaching II	Oral and Written Literature in Social Studies	General Physical Geography	Science, Technology and Society	General Human and Economic Geography	Human Rights and Democracy	Political Geography and Geopolitics of Turkey
Education Psychology	Culture and Language	Physical Geography of Turkey	Information Technologies	Economic Structure of Turkey	Citizenship Information	Culture and Language
Social Studies Learning and Teaching Approaches	Social Studies Teaching II	Social Studies Teaching II	Science and Research Ethics	Citizenship Education		Turkey's Human and Economic Geography
Character and Value Education	Local-Children's Games in Social Studies Teaching	General Human and Economic Geography	Fundamentals of Social Studies	Turkey's Human and Economic Geography		Media Literacy
Citizenship Information	Atatürk's Principles and History of Turkish Revolution I	Disasters and Disaster Management	Research Methods in Education	Environmental Education		Social Studies Learning and Teaching Approaches
Human Rights and Democracy	Social Anthropology and History of Civilizations	Physical Geography of Turkey	Education Philosophy	Economics and Innovation		Globalization and Society
Education Sociology	Historical Proof, Local and Oral History in Social Studies Teaching	Political Geography and Geopolitics of Turkey	History of First Turkish-Islamic States	Citizenship Education		
Human Relationships and Communication	Pre-Islamic Turkish History and culture	Citizenship Information	New and Modern History			
Media Literacy and Communication	History of First Turkish-Islamic States		History and Philosophy of Science			
	Ottoman History I-II					
	New and Modern History					

Table 5 gives the findings about the correlation of learning areas with lessons on the revised curriculum. As a result of document analysis, based on the findings in relation to the relationship among the lessons on the 2018 social studies teacher training curriculum with topics in the primary and middle school social studies lessons, it is possible to say that of the total of 131 outcomes on the 4th, 5th, 6th and 7th class MEB curriculum, 88 can be associated with lessons included in the undergraduate curriculum.

Based on data obtained from documents, it is possible to relate 17 of the 18 outcomes in the 'individual and society' learning area; 17 of the 19 total outcomes in the 'culture and heritage' learning area; 17 of the total 19 outcomes in the 'humans, places and environments' learning area; and 8 of the total 16 outcomes in the 'global connections' learning area.

As a result of document analysis, it was identified that 12 of the 18 outcomes in the 'science, technology and society' learning area could be associated with lesson content on the undergraduate curriculum. In social studies lessons, students should be able to compare the history of technological products and their current uses, classify technological products according to their area of use and describe inventors of technological products they use. The lesson on the undergraduate curriculum which meets these outcomes is 'science, technology and society'. This lesson content comprises developments in science and technology from the past to the present. In relation to this lesson, one lecturer stated;

> *"There's a science, technology and society lesson. This lesson doesn't go beyond a history lesson, in other words, science, technology and society is a problem on its own. We can still say this. In history this scientist found this, that, the other, the scientific process developed in this way and we reached the present, but we don't explain the present. In other words, I don't know how it should be included in a lesson, I can't conceptualize the name, but like I say if the content to follow technology only stays as science, technology and society, this lesson content should definitely fit the new pattern." (LS5, 28'53")*

Document analysis concluded that of the total 23 outcomes in the 'production, consumption and distribution' learning area, 10 were associated with lesson content included in the undergraduate curriculum. A lecturer considering the outcomes for the production, consumption and distribution learning area were not associated with sufficient lessons on the social studies teacher training curriculum stated the following;

> *"On the primary school curriculum, production, distribution, consumption is the learning area with most outcomes; however, on the undergraduate curriculum there is only one lesson called economy." (LS7, 05'47")*

Based on data obtained from documents, of the total of 18 outcomes belonging to the 'active citizenship' learning area, only 7 were associated with lesson content included in the undergraduate curriculum. In relation to this situation, the following statement was made;

> *"We say citizenship, but we appear to neglect citizenship. In other words, it's neglected in the social studies teacher training curriculum and neglected on the social studies primary-middle school curricula. As a result, we say cultivate good citizens, we say it's a target of social studies but we neglect the most important topic." (LS2, 37'38")*

Findings About Lessons on the 2018 Social Studies Teacher Training Curriculum Fulfilling Competencies Predicted in the Framework of Social Studies Teacher Training Competencies

With the aim of accessing findings about whether lessons on the 2018 social studies teacher training curriculum achieve the competencies predicted within the framework of social studies teacher training competencies, the 'social studies teacher training competencies' categories was found to have subcategories of 'planning and organizing the teaching process', 'learning and teaching process', 'monitoring and assessment', 'cooperation' and 'ensuring professional development' and codes related to these subcategories were created.

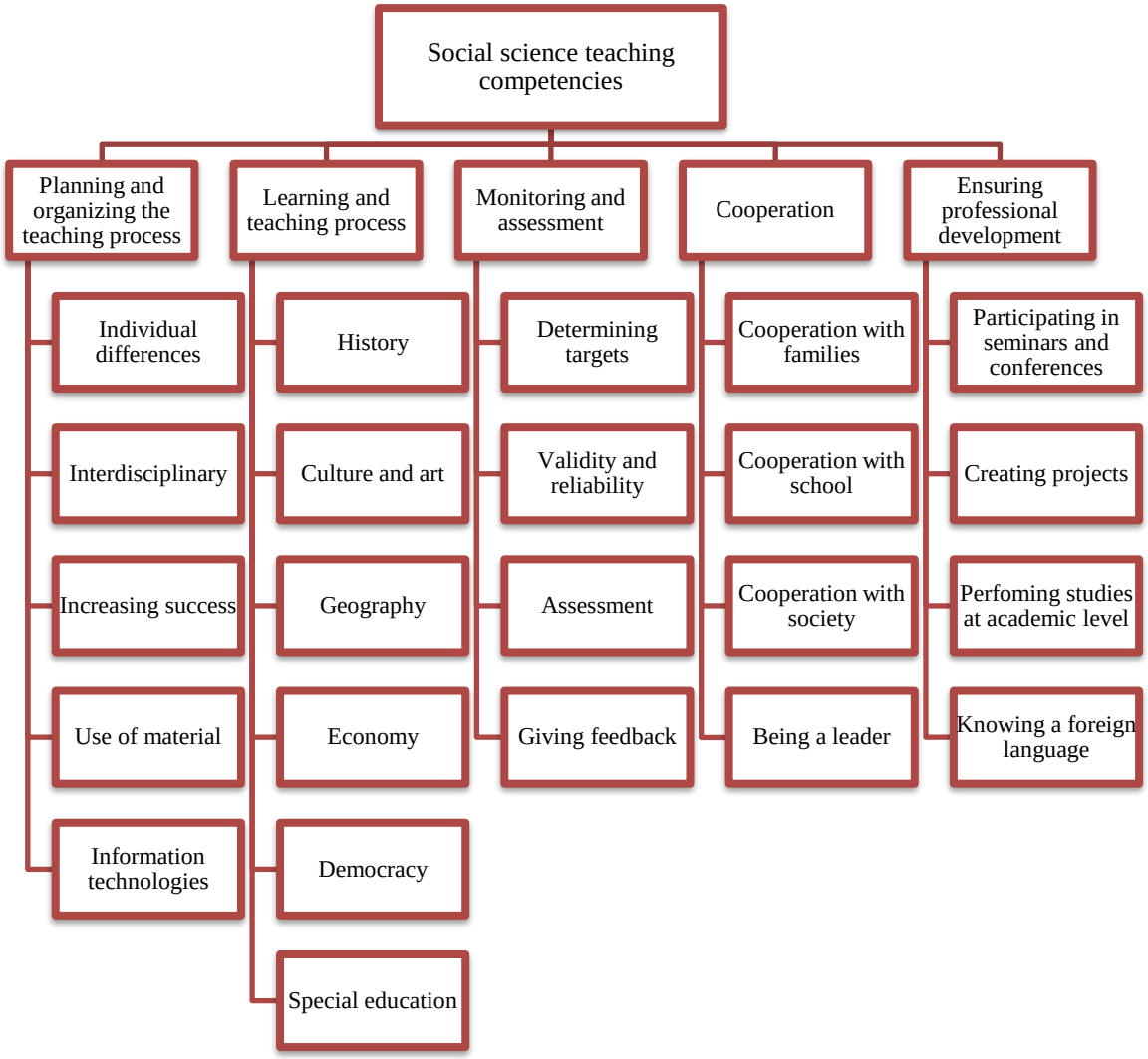

Figure 3. Subcategories and Codes Related to the "Social Studies Teacher Competencies" Category

The subcategories linked to the 'social studies teacher competencies' category and codes related to these subcategories are shown in Figure 3. It can be said that professional information lessons have an important place on the revised program to meet the planning and organization of the teaching process competency. A lecturer drew attention to the importance of individual differences in planning the teaching process and stated the following about the 'education psychology' lesson;

> *"The education psychology lesson was placed in the 2nd semester of 1st year; I think this lesson is very important because it's associated with many development processes in the learning concept so I don't think preservice teachers will conceptualize the importance of this lesson very quickly during the adaptation process to a new faculty and university. Even if they do grasp this, I think it is*

> *early to associate these concepts, to bring the virtual points together. In later years, in 2nd year, that's when it was previously. According to me there's nothing logical about putting it in 1st year." (LS7, 23'15")*

In relation to the skill of designing material belonging to the planning the teaching process competency, one lecturer stated the following about the 'teaching technologies' lesson;

> *"The teaching technologies lesson enters the professional information lessons. Which is to say that entering professional information, in fact means the educator, a non-social science person enters social studies lessons. I'm very curious about how someone from another field will teach a teaching technology to be used in social science." (LS5, 45'20")*

One of the competences related to planning the teaching process is the use of information technologies, found in the 'information technology' lesson on the undergraduate curriculum. In this lesson the importance of the use of the internet in education and the effects of computers on young people will be dealt with. The following opinion was stated in relation to this lesson;

> *"You put an information technology lesson, but I don't think we have teachers who can teach an information technology lesson. There is no teacher who can fulfill the content of this training, who has the quality to increase the skills of the students about this topic." (LS3, 32'11")*

In terms of fulfilling the competencies of managing the learning and teaching process, the education lessons on the revised curriculum have great importance. A lecturer criticized the topics encompassing learning and teaching processes on the social studies teacher training curriculum as being dominated by history and geography;

> *"Dealing with history and geography in this much detail and mainly spending the whole of the program on this is a bit problematic, I think. In other words, I think we need to include other areas to develop general culture instead. Because for a teacher to teach children a social event, it is necessary to know that event from many aspects, from historical, philosophical, sociologic and psychologic and then economic and even political. A student graduating from this curriculum will only have accumulated knowledge to be able to evaluate from more a historical and geographic perspective." (LS2, 08'00")*

In terms of fulfilling monitoring and assessment competencies, the 'social studies curricula' lesson included on the revised curriculum appears to focus on measurement and assessment

approaches. The ‘social studies teaching II’ lesson appears to provide information about techniques used for measurement and assessment applications. The ‘measurement and assessment in education’ lesson studies concepts like validity, reliability and feedback. The ‘morals and ethics in education’ lesson appears to focus on ethical principles in learning and assessment processes.

In terms of the topic of cooperation between school, family and society, the content of the ‘Turkish education system and school management’ lesson is important. The content of this lesson mentions cooperation between school, family and society in the education and teaching process. In relation to this lesson, a lecturer stated the following opinion;

> *“I still think some lessons were written to give lessons to certain lecturers in certain areas; in other words, there a lesson called Turkish education system and school management for example. Questions should be asked about how functional this lesson is in the teacher training process, how necessary it is.” (LS4, 16’06”)*

The content of the ‘class management’ lesson appears to focus on the importance of parent-teacher meetings. In relation to this lesson, the following opinion was expressed;

> *“There’s a lesson called class management, this very important lesson is an area which teachers should know very well. But this lesson is perceived as a lesson given by experts in education management, I see the continuous encouragement of this perception as very meaningless and problematic.” (LS4, 16’31”)*

Similarly, the content of the ‘special education and inclusion’ lesson appears to mention the importance of family participation in education and cooperation with families. In relation to this lesson, the following opinion was expressed;

> *“For example, there was no special education for us in the past and inclusive education in schools remained so difficult and students, we all experienced difficulties. Then special education came and we all relaxed.” (LS10, 16’13”)*

It is possible to say that the general culture lessons have an important place in the curriculum to fulfill the competency of ensuring professional development. To ensure preservice teachers have the ability to perform studies in relation to the field at academic level, the undergraduate curriculum includes ‘Turkish language I-II’ and ‘research methods in education’ lessons. In relation to this a lecturer stated;

> *"I gave the students homework and I wanted them to complete their homework as reports. I looked at the homework and it was a disaster; in other words, homework with the quality of a primary school, or I don't know, middle school student. Why was it all copy and paste for one? No student had gained any scientific quality. Whereas they had set the preparation criteria for the homework themselves, in other words you will write homework with the value of a scientific report, write the report in accordance with techniques in the scientific research methods lesson, there were criteria about whatever ethical writing rules. I said why did you do this? One said, up to today we gave teachers asking for reports empty CDs and got 100 points…" (LS3, 26'15")*

One of the competencies in the social studies field is the need to know at least one foreign language. To fulfill this competency, teacher training programs include a 'foreign language' lesson. In relation to the mandatory general culture lesson on the curriculum, a lecturer stated the following opinion;

> *"If I have to teach another person coming to university the Atatürk's principles and History of Turkish Revolution let's not teach it, it will be better. If I'm still trying to teach their main language, it's better so let's not teach it. If I try to teach information technologies in this semester, again, let's not. If we can't solve a foreign language in 2 hours per week there's no logic in doing it for 3 hours. But in the context of the constitution, you have to put it in mandatory lessons." (LS8, 24'58")*

Discussion and Conclusion

When the 2018 social studies teacher training curriculum is investigated, it appears some lessons were removed and other new lessons added, while some lessons only had names or semesters changed. In this way, it can be said the changes to the revised social studies teacher training curriculum were experienced in one dimension of the curriculum development process; content. Data obtained from interviews with lecturers contributing to the preparation of the curriculum have characteristics which support this finding.

The 'school experience' lesson removed from the social studies teacher training curriculum was found to be important by lecturers as it gave preservice teachers the opportunity to know their profession and opinions were stated about the need to include it in the first semester of the curriculum. Research by Tural (2018) revealed the 'school experience' lesson allowed

preservice teachers the opportunity to gain experience about the profession. Lecturers participating in this research had positive attitudes to the ‘drama’ lesson and appeared to think this lesson should not have been removed from the curriculum. When research by Başcı and Gündoğdu (2011) is examined, it was identified that preservice teachers had positive attitudes in relation to the ‘drama’ lesson. The ‘geography of countries’ lesson removed from the curriculum was among lessons criticized by lecturers. Research results by Öztürk and Günel (2016) from Eskişehir province revealed that teachers had insufficient preliminary information about this lesson and recommended the need for teacher training programs to provide education to train preservice teachers with a global viewpoint. Research by Acun, Yücel, Belenkuyu, & Keleş (2017) identified that the aims of social media use by university students changed linked to a variety of variables and they lacked confidence in social media. In this context, the ‘media literacy’ lesson added to the program can be said to provide benefit to preservice teachers about the effective and safe use of social media. Research results by Deveci and Çengelci (2008) were observed to include the recommendation to add a ‘media literacy’ lesson to teacher training curricula.

The lecturers participating in this research stated lessons in faculties are not carried out in accordance with the constructivist approach. Research by Ateş, Çetinkaya Özdemir and Taneri (2019) stated that preservice class teachers did not receive education in accordance with the constructivist teaching model and that lessons were carried out according to traditional methods. Lecturers contributing to preparation of the revised social studies teacher training curriculum stated that as year level increased, the motivation of preservice teachers decreased. In parallel with this result, quantitative research investigating motivation related to the teaching profession by preservice social studies teachers by Recepoğlu and İbret (2019) identified that as class level increased the motivation of preservice teachers for the teaching profession lowered. According to quantitative research results by Gündoğdu, Çimen and Turan (2008) investigating preservice teacher opinions with a survey, they concluded that as class level increased, exam stress increased.

This study was carried out with the aim of investigating the revised social studies teacher training curriculum revealed that the problems present in the transformation process of a theoretically organized curriculum into implementation continued. Research results by Yapıcı and Demirdelen (2007) identified differences of opinion among teachers about the

applicability of the social studies curriculum. In light of findings obtained in the research, the following recommendations are made for policy-makers and researchers.

Recommendations

- Environments should be created to ensure exchange of ideas between people responsible for the curriculum development process in the future.
- Before implementing the developed curriculum, it will be beneficial to carry out pilot studies and evaluate the results.
- In future curriculum development processes, importance should be given to the learning and teaching process and measurement and assessment dimensions, in addition to the content dimension of the curriculum.
- The effect of lecturers giving lessons in the process of developing competencies in terms of profession of preservice social studies teachers is great. Studies should be performed which would reveal the quality of lecturers giving lessons in social studies teacher training undergraduate departments.
- According to the data obtained in this study, one of the problems affecting the learning and teaching processes is motivation. Studies should be performed about how to resolve factors lowering motivation of preservice social studies teachers towards the teaching profession.

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Research Article

A Holistic View to Barriers to Technology Integration in Education

Şule Betül Tosuntaş[1], Zühal Çubukçu[2], Tuğba İnci[3]

Abstract

Technology integration is sustainable and persistent change in the social system of schools caused by the adoption of technology to help students construct knowledge (Belland, 2009). Although it is not possible for technology integration initiatives to have an absolute purpose, studies are conducted and application examples are designed to make this integration process more effective and efficient. The focus of many of research is to identify barriers to technology integration and provide solutions. In literature, factors affecting technology integration in education are handled in different ways and various classifications are used. The aim of this study is to compile the results of research on factors affecting technology integration in education according to Hew and Brush (2007) and Belland (2009) classification. This study was designed using integrative review method which is one of the literature review methods. In this study, barriers and solutions to the integration of technology in education are determined by Hew and Brush (2007) (*i*) resources, (*ii*) knowledge and skills, (*iii*) institution, (*iv*) attitudes and beliefs, (*v*) assessment, (*vi*) subject area culture, and (*vii*) habitus determined by Belland (2009). When the barriers to technology integration in education are examined, it is seen that these barriers are mostly directed towards teachers. In other words, teachers' knowledge, skills, attitudes, beliefs and inclinations on integration should be emphasized after the elimination of external barriers in order to achieve technology integration. Technology integration should be seen as adapting and transforming it into a culture rather than a mechanical process.

Keywords: *Barriers, institutional substructure, habitus, teacher beliefs, technology integration.*

[1] Asst.Prof.Dr., Bursa Uludag University, Faculty of Education, Department of Educational Sciences, sbtosuntas@uludag.edu.tr, https://orcid.org/0000-0002-0731-6505
[2] Prof.Dr., Eskişehir Osmangazi University, Faculty of Education, Department of Educational Sciences, zcubukcu@ogu.edu.tr, https://orcid.org/0000-0002-7612-7759
[3] Dr., Eskişehir Osmangazi University, Faculty of Education, Department of Educational Sciences, tinci@ogu.edu.tr, https://orcid.org/0000-0001-5988-3969

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Eğitimde Teknoloji Entegrasyonunun Önündeki Engellere Bütüncül Bir Bakış

Öz

Teknoloji entegrasyonu, öğrencilerin bilgiyi yapılandırmalarına yardımcı olmak amacıyla teknolojinin benimsenmesi sonucunda okulların sosyal sisteminde sürdürülebilir ve devam eden bir değişimdir. Teknoloji entegrasyonu girişimlerinin mutlak bir amacının olması mümkün görülmemekle birlikte, bu entegrasyon sürecinin daha etkili ve verimli olması adına araştırmalar yapılmakta ve uygulama örnekleri tasarlanmaktadır. Bu araştırmaların birçoğunun odak noktası teknoloji entegrasyonunun önündeki engelleri belirlemek ve çözüm yolları sunmaktır. Literatürde eğitimde teknoloji entegrasyonunu etkileyen faktörler faklı şekillerde ele alınmakta ve çeşitli sınıflandırmalar kullanılmaktadır. Bu çalışmanın amacı, eğitimde teknoloji entegrasyonunu etkileyen faktörlere yönelik yapılmış araştırma sonuçlarını Hew ve Brush (2007) ve Belland'ın (2009) sınıflandırması doğrultusunda derlemektir. Bu çalışma literatür değerlendirme yöntemlerinden bütünleştirici değerlendirme yöntemi kullanılarak desenlenmiştir. Bu çalışma kapsamında eğitimde teknoloji entegrasyonu önündeki engeller ve çözüm önerileri Hew ve Brush'ın (2007) belirlediği *(i)kaynaklar,* (*ii*)*bilgi ve beceriler,* (*iii*)*kurum,* (*iv*)*tutumlar ve inançlar, (v)değerlendirme, (vi)konu alanı kültürü* ve Belland'ın (2009) belirlediği *(vii)habitus* olmak üzere toplam 7 kategori altında incelenmiştir. Eğitimde teknoloji entegrasyonunun önündeki engeller incelendiğinde bu engellerin daha çok öğretmenlere yönelik olduğu görülmektedir. Diğer bir ifadeyle, teknoloji entegrasyonunu gerçekleştirmek amacıyla dışsal engellerin ortadan kaldırılması sonrasında öğretmenlerin entegrasyon konusundaki bilgi, beceri, tutum, inanç ve eğilimleri üzerinde durulmalıdır. Teknoloji entegrasyonu, mekanik bir süreçten çok, bireysel ve kurumsal düzeyde teknolojiye uyum sağlama ve bunu bir kültür haline dönüştürme olarak görülmelidir.

Anahtar Sözcükler: *Engeller, habitus, kurumsal altyapı, öğretmen inançları, teknoloji entegrasyonu.*

Introduction

Technology is one of the most important parts of our daily lives, it has become impossible to think of education and teaching independently from technology. Technology integration with continuous development and change of technology continues to be one of the most important reforms in education (Jhurree, 2005; Jonassen, Peck, & Wilson, 1999; Polly, Mims, Shepherd, & Inan, 2010). Many projects around the world have been implemented in order to ensure technology integration and include ICT tools such as interactive boards, tablets, laptops and projectors in schools; high level access to software, internet infrastructure and various equipments (Beauchamp, 2004; Falloon, 2015; MoNE, 2017; Pamuk, Çakır, Ergun, Yılmaz, & Ayas, 2013; Smith, Higgins, Wall, & Miller, 2005; Slay, Siebörger, & Hodgkinson-Williams, 2008; Türel, 2011).

On the one hand, while technology integration studies gain momentum in schools, it is seen that research on technology integration has increased. In many studies examining the effects of the use of various technologies in education, it has been concluded that technology positively affects learning and success when used with appropriate pedagogical methods (Albaaly & Higgins, 2012; Almekhlafi, 2006; Erbas, Ince, & Kaya, 2015; Lei & Zhao, 2007; Malik & Shanwal, 2015; Mouza, 2008). However, it is thought that the results of these research are insufficient to say that the use of technology is effective in improving the quality of teaching and providing learning (Inan & Lowther, 2010). In addition, although access to technology is easier in schools, it is seen that technology is not used as often as desired in education (Belland, 2009; Inan & Lowther, 2010) and has not yet been able to improve the teaching practices in the classroom (Lim & Chai, 2008; Lowther, Inan, Strahl, & Ross, 2008).

Technology Integration in Education

While there is no clear definition of technology integration due to the ever-changing nature of technology and different perspectives, it can be said that it is a process that contributes to students' learning. Widely varying definitions of technology integration have emerged that; a sustainable and on-going change in the social system of schools as a result of the adoption of technology to help students structure information (Belland, 2009); using ICT tools for teaching

in schools (Hew & Brush, 2007); the use of ICT tools as integrative or mediator to perform learning and teaching activities (Lim, 2007) or the use of technology as a tool to support the learning process by teachers and students (Polly et al., 2010).

Similar to the different perspectives in the definition of technology integration in education, there are several models for integration in the literature. These models are Technological Pedagogical Content Knowledge Model (Koehler & Mishra, 2005), Technology Integration Planning Model (Robyler, 2006), Social Model (Wang, 2008), Systematic ICT Integration Model (Wang & Woo, 2007), Pierson's Technology Integration Model (Modified) (Woodbridge, 2003), Apple Classrooms of Tomorrow Model (Dwyer, Ringstaff, Sandholtz, & Apple Computer Inc., 1990), A Five-Stage of Computer Technology Integration Model (Toledo, 2005), E-capacity Model (Vanderlinde & Van Braak, 2010), 5W 1H Model (Haslaman, Mumcu, & Usluel, 2008) and the Activity System Model (Demiraslan & Usluel, 2006). The focus of these models is on different components such as educational institution, teacher, curriculum, process, benefit, pedagogical theories, learning, and technology. Each model proposes useful frameworks for teachers to ensure technology integration in education.

Technology integration in education is difficult and problematic (Cuban, Kirkpatrick, & Peck, 2001; Ertmer, 1999; Voogt & McKenney, 2017); it is also considered as a slow and complex process affected by many factors (Ertmer et al., 2012; Kim, Kim, Lee, Spector, & DeMeester, 2013; Valcke, Rots, Verbeke, & Van Braak, 2007; Webb & Cox, 2004). There is a consensus in the literature that technology integration cannot be fully achieved (Bauer & Kenton, 2005; Ertmer, 2005; Hew & Brush, 2007; Ilgaz & Usluel, 2011; Inan & Lowther, 2010; Lawless & Pellegrino, 2007; Thompson, Schmidt, & Davis, 2003). The use of technology in schools is expected to increase as a result of the widespread use of many technologies in schools through high budget projects and initiatives. However, teachers often use technology for non-instructional purposes (Cuban et al., 2001; Gray, Thomas, & Lewis, 2010; Hur, Shannon, & Wolf, 2016; Russell, Bebell, O'Dwyer, & O'Connor, 2003 and also, they give exaggerated responses to data collection tools related to the use of technology (Kopcha & Sullivan, 2007). According to these results, it can be said that technology integration is not of the expected quality and quantity.

While it is not possible for technology integration initiatives to have an absolute purpose, research are being conducted and application examples are designed to make this integration process more effective and efficient. In the literature, technology integration has been discussed with many concepts. Such as professional development (Kopcha, 2012; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010), subject area (Hennessy, Ruthven, & Brindley, 2005; Howard, Chan, Mozejko, & Caputi 2015; Lim, 2007), self-efficacy belief (Abbitt, 2011; Wang, Ertmer, & Newby, 2004), attitude (Van Braak, 2001), pedagogical beliefs (Inan & Lowther, 2010; Lim & Chai, 2008; Liu, 2011; Sang , Valcke, Van Braak, & Tondeur, 2010), epistemological beliefs (Maor & Taylor, 1995), technopedagogical content knowledge (Ay, Karadag, & Acat, 2015; Polly et al., 2010), habitus (Belland, 2009), teacher training (Lawless & Pellegrino, 2007), teaching activities (Liu, 2011; Teo, Chai, Hung, & Lee, 2008; Yen & Lee, 2011), curriculum (Pac, 2008), technical or managerial support (Bradshaw, 2002; Glazer, Hannafin, & Song, 2005; Glazer, Hannafin, Polly, & Rich, 2009) and interactive whiteboard, tablet technologies (Moran, Hawkes, & Gayar, 2010; Pamuk et al., 2013). The focus of many of these research is to identify barriers to technology integration and provide solutions.

In literature, factors affecting technology integration in education are handled in different ways and various classifications are used. The aim of this study is to compile the results of research on factors affecting technology integration in education according to Hew and Brush (2007) and Belland (2009) classification. In this context, barriers and solutions to technology integration in education were examined under following categories: (*i*) Resources, (*ii*) knowledge and skills, (*iii*) institution, (*iv*) attitudes and beliefs, (*v*) assessment, (*vi*) subject area culture and (*vii*) habitus.

Methodology

This study was designed using integrative evaluation method which is one of the literature evaluation methods. Integrative evaluation is defined as a type of literature evaluation in which the current information situation on a subject is presented and summarized, and the consensus and disputes related to the subject are highlighted (Neuman, 2007). The study was conducted in five stages: (*i*) identifying the research problem, (*ii*) collecting the data, (*iii*) evaluating the

data, (*iv*) analyzing and interpreting the findings, and (*v*) evaluating the information obtained and making recommendations on the research topic (Cooper, 1986).

Findings

Barriers to Technology Integration in Education

Many studies aiming at increasing the effectiveness of technology integration in education have focused on the barriers to technology integration. Barriers to technology integration in education; through quantitative research, structural equation modeling or regression analysis; and in qualitative research, it was determined through content analysis or descriptive analysis of data based on observation and interview. These barriers are addressed using different classifications.

Barriers were first conceptualized as internal and external barriers by Ertmer (1999). Internal barriers can be explained as beliefs, perceptions, and attitudes about the learning-teaching process in which individuals cannot be noticed from outside and perhaps even the individual is not aware of them. It suggests that internal barriers are more difficult to overcome than external barriers due to the possibility of not being made concrete and not being aware of even the individual himself/herself (Ertmer, 1999). One thing to consider is that these barriers cannot be addressed solely for teachers. However, teachers' key role in technology integration shows that many of these barriers are related to teachers. Ertmer (1999) states that external barriers, which are defined as the absence or insufficiency of external resources such as access to technology, time, support and education for teachers, are more easily measured and resolved than internal barriers. With the investments made to ensure technology integration, considering that the necessary resources are provided in schools, it is concluded that overcoming external barriers alone is not sufficient for technology integration.

Hew and Brush (2007) identified 123 barriers by examining 43 empirical studies, and then summarized under following 6 categories (*i*) resources, (*ii*) knowledge and skills, (*iii*) institution, (*iv*) attitudes and beliefs, (*v*) assessment and (*vi*) subject area culture. Belland (2009) underlines teacher beliefs in the integration process. He tried to explain how these beliefs were

shaped by Bruner (1996) 's public pedagogy and Bourdieu (1979)' s habitus concepts. Tsai and Chai (2012) highlighted the dynamics of the classroom environment and underlined that design-oriented thinking, which enables them to produce and organize materials and activities to meet the instructional needs of learners, can be another type of barrier. Kopcha (2012), on the other hand, discussed the criticisms of the failure to achieve technology integration despite the time, money and efforts spent and pointed out the barriers faced by teachers in providing technology integration. These barriers are summarized under (*i*) access, (*ii*) vision, (*iii*) beliefs, (*iv*) time and (*v*) professional development. In this research addressed barriers are as shown in Figure 1.

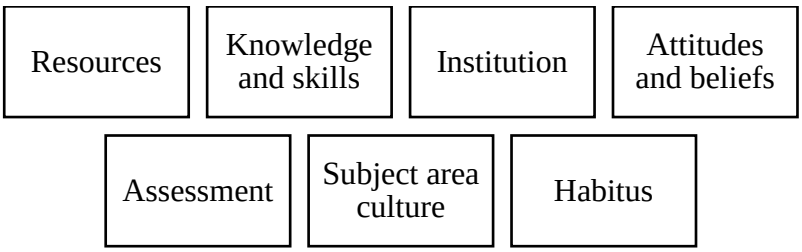

Figure 1. Barriers to technology integration

Resources

The existence of technology, access to existing technologies, technical support, lack of time and software are considered as barriers to integration (Hew & Brush, 2007). It is stated that the existence of technology and access to technology is one of the most important elements of technology integration (Hew & Brush, 2007; Nikolopoulou & Gialamas, 2015) and teachers need to be supported regularly on a managerial and technical basis (Ertmer & Ottenbreit-Leftwich, 2013; Hur et al., 2016). Teachers have very limited technical support in schools (Cuban et al., 2001), and they are disappointed when they want to access technology and have problems in terms of technical or access (Sandholtz, 2001), however, when access and support is provided for continuous education, usage is in high level (Lowther et al., 2008). In addition, it was seen that teachers could not find time for preparation due to their intensive course loadings (Al-Alwani, 2005; Sicilia, 2005) and that they could experience burnout when they spent the extra time required for preparation process (Hew & Brush, 2007).

Knowledge and skills

In technology-assisted instruction, the lack of technological knowledge, techno-pedagogical knowledge, classroom management knowledge, and skills is defined as the biggest barrier to technology integration (Hew & Brush, 2007). It is interesting that teachers do not prefer to use technology in teaching because of their anxiety and insecurity about this disability (Wachira & Keengwe, 2011). The use of technology in teaching requires teachers to change their existing pedagogy and classroom management knowledge. On the other hand, the use of technology is seen as a burden both in terms of its use during teaching and in terms of pedagogy and technical knowledge to be learned (Belland, 2009; Kopcha, 2012). Therefore, teachers, who do not prefer change, reflect the shape they will draw on the blackboard by means of a projection device and use technology only as a passive tool within the framework conceptualized by Beauchamp (2004).

From a professional development perspective, teachers need to be supported on how to integrate technology and make it routine. Another point that stands out in this context is that it does not contribute to the technology integration if there is no support given after one-time workshops and ordinary seminars (Scott & Mouza, 2007; Brinkerhoff, 2006). On the contrary, it was seen that teachers who participated in learning communities continued to use technology after intensive professional training (Cifuentes, Maxwell, & Bulu, 2011). Kopcha (2012) concluded that in a two-year professional development study with the mentor, teachers could develop activities and routines that teachers could use in their teaching practices.

Institution

Institutional barriers express high-level factors such as leadership, school planning, vision, and education policies. Inadequate or insufficient institution and country policies in terms of supporting technology integration will lead to the failure of technology integration (Vanderlinde & Van Braak, 2010; Mazman & Usluel, 2011). The fact that teachers, although competent in terms of technology integration, could not be successful without the support of managers (Dawson & Rakes, 2003) shows that managers play a key role in this process. In this respect, managers need to develop and adopt an institutional technology vision (Kopcha, 2012; Sheninger, 2014).

Attitudes and beliefs

Teachers' epistemological beliefs, beliefs about effective teaching methods, beliefs about technology, pedagogical beliefs; teacher self-efficacy, professional development, openness to innovation, attitudes towards technology are the concepts discussed in research in many contexts. In terms of technology integration, teacher beliefs have the most important role in the teacher's decision to use technology (Ertmer & Ottenbreit-Leftwich, 2010; Inan & Lowther, 2010). Inan and Lowther (2010) examined the factors affecting technology integration by path analysis and concluded that teachers' computer self-efficacy and beliefs had an effect on technology integration.

As it is known, teacher's pedagogical beliefs have an effect on traditional or constructivist shaping of teaching. Similarly, there are studies that found that constructivist beliefs and practices are important predictors of technology use (Ertmer, 2005; Overbay, Patterson, Vasu, & Grable, 2010; Sang et al., 2010). In the literature, many internal factors are emphasized such *teachers' pedagogical beliefs* (Ertmer et al., 2012, Inan & Lowther, 2010; Lim & Chai, 2008), *epistemological beliefs* (Kim et al., 2013), *self-efficacy beliefs* (Inan & Lowther, 2010), attitudes (Lim & Chai, 2008, Van Braak, 2001) and their *resistance to change* (Gomez, 2005). Arslan (2016) states that teachers' attitude towards technology integration is the most important factor affecting technology integration. In addition to this, the factors that affect the attitude of teachers are to see technology as a new teaching approach, to consider that it will be used more efficiently in certain branches. Demirbağ (2018) concluded that teachers' technopedagogical content belief systems affect technology integration.

With overcoming external barriers to technology integration, researchers' focus has shifted towards the quality of integration. In many countries, access to technological infrastructure in schools is thought to be a smaller problem than in the past (Belland, 2009). In this respect, as mentioned earlier, it is expected to teachers use technology, not as a passive tool, as an active and interactive tool. Also are expected to implement applications based on technopedagogical

knowledge that will meet their students' requests and needs (Ottenbreit-Leftwich et al., 2010; Ertmer et al., 2012). Meeting these expectations will be possible by changing teachers' attitudes and beliefs.

Assessment

The assessment, which is generally defined as the measurement of learning, is considered in two ways as formative and summative assessment. National examinations for students' graduation or progression to the next level are examples of summative assessment. It is stated that teachers' being under the pressure of these national exams is one of the barriers to technology integration (Hew & Brush, 2007). They tend to prefer traditional methods that they believe to be more applicable in teaching. This tendency can stem from inadequate time to plan and use technology (Butzin, 2004; Fox & Henri, 2005), and insufficient knowledge and belief to achieve higher and meaningful learning outcomes with technology integration in national exams (Ertmer & Ottenbreit-Leftwich, 2010). However, contrary to these beliefs and expectations of teachers; Ertmer et al. (2012) found that the classes of teachers providing technology integration achieved higher levels of success in national exams than before.

Subject area culture

Subject area culture points out that each subject area has its own content, pedagogy and evaluation approach and that is one of the barriers to technology integration (Selwyn, 1999). These subject-specific approaches diversify the pedagogical perspectives of teachers in different disciplines (Niederhauser & Stoddart, 2001) and influence the use of technology in instructional applications (Hennesy et al., 2005; Howard et al., 2015; Selwyn, 1999). Accessible technological materials and software, resistance to change, the use of technology, the support of colleagues differ in various fields (Hennesy et al., 2005; Howard et al., 2015). It is known that field teachers create various learning communities in order to achieve effective technology integration. Selwyn (1999), in research conducted with teachers and students in various fields, explained how the subject area is determining the opinions of individuals about the use of technology. Arslan (2016) has stated that teachers believe that technology will be used efficiently in certain branches. Specifically, Educational Informatics Network (EBA) in Turkey is important in terms of providing material support to teachers, but it is difficult to

mention the existence of a number of content equal to in terms of content and grade level. It is possible to say that the number and quality of materials are higher in certain courses. In spite of that, technology integration in areas such as arts and physical education in the context of the subject area is more difficult, also lack vision, resistance to change, the idea of breaking away from the essence of the field limits the use of technology.

Habitus

Belland (2009), has explained the barriers to technology integration on the basis of Bruner' (1996) folk pedagogies and has used Bourdieu's (1979) Habitus Theory which explains the individual's sense, thinking and behavior schemes. Based on the studies that concluded that teachers' teaching behaviors were affected by their experiences when they were students (Marsh, 2006; Noyes, 2004); It is stated that the tendencies resulting from the experiences of the teachers in their own learning lives, in other words, the habitus affect the integration of technology (Belland, 2009). Although teachers have been learned about contemporary approaches such as constructivism, research have concluded that they use traditional teacher-centered approaches in the teaching process (Shriki & Lavy, 2005; Windschitl, 2002).
Arslan (2016) stated that one of the barriers to technology integration in Turkish education is the quality of pre-service and in-service trainings given to teachers. In this context, it can be concluded that the trainings for the effective use of technology in the classroom were insufficient. As emphasized by Belland (2009), technology integration or educational technology courses should enable prospective teachers to apply the theoretical knowledge gained in various periods.

Discussion and Conclusion

Many studies conducted on the integration of technology into the education process have concluded that teachers, students, administrators, and parents have positive opinions. However, failure to provide the required level of technology integration is still a problem try to solve. When the literature was examined, it is seen that the researchers agree that technology integration could not be achieved completely. It is also interesting to note that, although the factors affecting technology integration are clearly known, this still remains unresolved.

Barriers to technology integration in education are also factors affecting technology integration. Factors affecting technology integration in education are considered as internal and external factors. However, it is stated that external factors are more likely to be detected and eliminated than internal factors (Ertmer, 1999). Accordingly, teachers' attitudes and beliefs can be seen as the reason why effective technology integration cannot be achieved despite the elimination of external barriers such as the existence of technology and access to education. Therefore, in order to achieve an effective integration process, research can be conducted which will enable teachers to develop positive beliefs about technology and integration. The main barriers to technology integration in education are called resources. This barrier covers follow; lack of technology, lack of access to existing technology, lack of administrative support, lack of technical support, lack of time for course preparation, and inadequate software (Hew & Brush, 2007; Nikolopoulou & Gialamas, 2015; Ertmer & Ottenbreit-Leftwich, 2013; Hur et al., 2016; Al-Alwani, 2005; Sicilia, 2005).

The second barrier to technology integration is teachers' perceptions of their inadequacy or lack of knowledge and skills (Hew & Brush, 2007). The third barrier is called institutional barriers and includes educational policies of institutions and countries (Vanderlinde & Van Braak, 2010; Mazman & Usluel, 2011). Educational policies of institutions and countries are effective in achieving technology integration. Policies that support teachers in this regard contribute to the achievement of integration.

The fourth barrier is attitudes and beliefs. Bandura states that an individual's efficacy beliefs will have an effect on their attitudes and behaviors (Bandura, 1977) and that higher efficacy beliefs have an effect on the stability of their actions (Bandura, 1986; 1997). The most important factors affecting individuals' use of technology are generally their attitudes and beliefs towards technology. In terms of technology integration, teachers should first decide on the use of technology and show determination in these actions. Even if teachers have technology knowledge and technopedagogical knowledge, it is expected that their belief that the use of technology will improve their teaching performance and not require much effort. Obviously, it is not enough for teachers to have a certain level of knowledge and skills alone, also their beliefs in the use of technology should affect their behavior positively. Because of

the rapid change in technology, instead of teachers adopting and using a particular technology; they should be innovative and pioneering individuals (Tosuntaş, 2017).

The fifth barrier is that teachers do not have enough time to plan and use technology in teaching because of national exams to evaluate students (Butzin, 2004; Fox & Henri, 2005) and teachers' insufficient belief that high-level learning and high success can be achieved through technology integration in national exams (Ertmer & Ottenbreit-Leftwich, 2010). In this respect, it is necessary to develop beliefs that teachers' use of technology in teaching does not constitute a barrier for preparation for exams and on the contrary, they can achieve higher levels of success with technology.

The sixth barrier is the subject area culture. Each subject area has its own content, pedagogy and evaluation approach (Selwyn, 1999). These approaches diversify the pedagogical perspectives of teachers in different disciplines (Niederhauser & Stoddart, 2001) and influence the use of technology in instructional practices (Hennesy et al., 2005; Howard et al., 2015; Selwyn, 1999). It can be considered relatively easy to access and use materials, especially in areas such as science and mathematics. Therefore, additional studies are needed to ensure technology integration in disadvantaged branches such as arts and physical education without lose the field's soul.

The last barrier is the tendencies that are formed as a result of the experiences of teachers in their own learning life; habitus. Definitely, it can be foreseen that these trends will affect not only technology integration but also the entire teaching-teaching behavior of teachers. The fact that the tendencies arising from past experiences have such an effect on the individual's behaviors reveals the importance of teacher education. Numerically, it is difficult to reshape 12-year educational background of prospective teachers with approximately 4-year programs. On the other hand, when teacher education is taken into account, it is worth discussing the experiences created in the courses where technology integration and constructivism are conveyed through ineffective traditional methods. According to these experiences, prospective teachers can choose to follow the way they see or learn. It is evident that if the faculty members do not integrate technology in their courses and the prospective teachers cannot create experiences related to the technology integration process throughout their lives, this will have a negative impact on their professional life.

Consequently, the main barriers to technology integration in education as follows: Presence of technology and access to technology, teachers' techno pedagogical knowledge (Hew & Brush, 2007), educational policies (Vanderlinde & Van Braak, 2010; Mazman & Usluel, 2011), teachers' attitudes and beliefs (Ertmer & Ottenbreit-Leftwich, 2010; Inan & Lowther, 2010), the pressure of national exams on teachers (Hew & Brush, 2007), the subject area (Selwyn, 1999) and the teaching tendencies of prospective teachers (Belland, 2009). When the barriers to technology integration in education are examined, it is seen that these barriers are mostly related to teachers. For this reason, teachers' knowledge, skills, attitudes, beliefs, and tendencies about integration should be emphasized after the elimination of external barriers in order to achieve technology integration. For all that, teachers need to be supported in the process of technology integration, so both institutions as schools and curricula should be able to support teachers. Hew and Brush (2007) described strategies to overcome barriers and could be useful in general: (*i*) having a shared vision and technology integration plan, (*ii*) overcoming the scarcity of resources, (*iii*) changing attitudes and beliefs, (*iv*) conducting professional development and (*v*) reviewing assessments.

Technology integration should be seen as adapting to technology and transforming it into the culture at an individual and institutional level rather than a mechanical process (NCES, 2002). Future research should be to identify specific barriers to technology integration in the context of Turkey. On the other hand, in order to overcome the barriers, the effectiveness of various sustainable teacher working groups can be examined.

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Research Article

STEM Education for Disadvantaged Students: Teacher and Student Experiences[1]

Esra Bozkurt Altan[2], Esra Köroğlu[3]

Abstract

STEM education is based on interrelated and holistic teaching of the disciplines of science, technology, engineering and mathematics. It is important to ensure that STEM education does not address a certain category of society only but that it is also applied to disadvantaged segments of society. The aim of the present study is to identify the opinions of socio-economically disadvantaged students and their teachers about STEM education experience. The study was planned according to the case study model. The participants of the research consisted of a teacher and 34 Grade-8 students studying in a regional boarding school (RBS) in a northern province of Turkey. In the study, a unit (Living Beings and Life) within the scope of 8th grade science course was planned in accordance with STEM education. The data of the study were collected through student diaries and the field notes taken by the teacher. The data obtained from student diaries were subjected to content analysis, and the field notes were analysed with descriptive analysis. It was determined that the RBS students evaluated STEM-focused activities and the related applications in terms of their contributions to their learning process, 21st-century skills, their perceptions about STEM disciplines and the development of their career awareness on STEM fields. The results obtained from the teachers' field notes showed that the students' participation and group work skills increased, that the students had fun and became motivated in the course, and that they experienced an improvement in their skills of associating what they learned with their daily life, solving problems and designing and in their engineering awareness.

Keywords: *Disadvantaged students, regional boarding secondary school students, social justice, STEM*

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[2] Dr. Lecturer, Corresponding Author, Sinop University, College of Education, Science and Mathematics Education Department, esrabozkurt@sinop.edu.tr, https://orcid.org/0000-0002-5592-1726

[3] Science Teacher, Ministry of Education, https://orcid.org/0000-0001-9270-0992

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Dezavantajlı Öğrenciler için STEM Eğitimi: Öğretmen ve Öğrenci Deneyimleri

Öz

STEM Eğitimi, fen, teknoloji, mühendislik ve matematik disiplinlerinin birbiri ile ilişkili ve bütüncül öğretimini esas almaktadır. STEM eğitiminin toplumun yalnızca belirli bir kesimine hitap etmesinden kaçınılması ve toplumun dezavantajlı kesimlerine de uygulanması önem arz etmektedir. Araştırmanın amacı sosyo-ekonomik olarak dezavantajlı öğrencilerin ve öğretmenlerinin STEM eğitimi deneyimine yönelik görüşlerini ortaya koymaktır. Araştırma durum çalışması modelinde planlanmıştır. Araştırmanın çalışma grubunu Türkiye'nin kuzeyinde bir ilde yatılı bölge okulunda öğrenim görmekte olan 34 sekizinci sınıf öğrencisi ve bir fen bilimleri öğretmeni oluşturmuştur. Araştırmada 8. sınıfı fen bilimleri dersi kapsamında bir ünite (Canlılar ve Hayat) STEM eğitimine uygun olarak planlanmıştır. Araştırmanın verileri öğrencilerin günlükleri ve uygulayıcı tarafından tutulan alan notları ile toplanmıştır. Öğrencilerin günlüklerinden elde edilen verilerin analizi içerik analizi ile, alan notları ise betimsel analiz ile çözümlenmiştir. Yatılı bölge okulu öğrencileri STEM odaklı etkinlikler ile yürütülen uygulamaları; öğrenme sürecine, 21. Yüzyıl becerilerine, STEM disiplinlerine yönelik algılarına ve STEM alanlarında kariyer farkındalığına olumlu etkisi olduğu şeklinde değerlendirmişlerdir. Uygulayıcı ise, uygulamaların öğrencilerin derse katılımını ve grup çalışması becerisinin arttığını, öğrencilerin derste eğlendiklerini ve motive olduklarını, günlük yaşam ile öğrendiklerini ilişkilendirme, problem çözme ve tasarım becerilerinin gelişimini sağladığı ve mühendisliğe yönelik farkındalıklarının gelişim gösterdiği şeklinde değerlendirmiştir.

Anahtar Sözcükler: *Dezavantajlı öğrenciler, yatılı bölge ortaokulu öğrencileri, sosyal adalet, STEM.*

Introduction

The abbreviation STEM (Science, Technology, Engineering, Mathematics) represents one of the educational approaches that propose the integration of disciplines which have become very popular in the international literature. This educational approach is based on the interrelated and holistic teaching of the disciplines of science, technology, engineering and mathematics. The main point of this approach is to ensure that individuals are faced with problems which are compatible with the real lives and contexts of individuals, which require them to employ their knowledge and skills about the disciplines of science, technology, engineering and mathematics and which have multiple solutions, and that they produce solutions for these problems (Sanders, 2009; Shaughnessy, 2013; Smith & Karr-Kidwell, 2000). The process of finding solutions to real life problems ensures to improve individuals' 21st-century skills such as entrepreneurship, innovation, creative thinking, decision making and problem solving in addition to their knowledge and skills related to STEM disciplines (Ellis & Fouts, 2001; Rogers & Portsmore, 2004; Schnittka & Bell, 2011; Smith & Karr-Kidwell, 2000) and to raise their interest in and career awareness about STEM fields (Dubetz & Wilson, 2013; Gülhan & Şahin, 2016). The influence of the developments in the fields of science, technology, engineering and mathematics on the economic development of countries in the present century makes it important for individuals to increase their interest and career awareness (National Academy of Engineering [NAE] & National Research Council [NRC], 2009; NRC, 2012). However, the multidisciplinary nature of real-life problems and also factors like the contribution of this approach to the skills individuals should have in the 21st-century can be considered as important reasons for which this approach has become popular.

There are many studies on how STEM education, which is related to this highly popular approach, will be carried out in education systems with disciplinary education programs, how to improve teachers' qualifications, how STEM education will be applied with various methods, and its impact on students (Doppelt, Mehalik, Schunn, Silk & Krysinski, 2008; Ellefson, Brinker, Vernacchio & Schunn, 2008; Wendell, 2008). Despite the existence of numerous studies in literature, attention is drawn to the fact that applications which are not compatible with the purposes of STEM education can be encountered in Turkey (Çepni, 2017; Karahan, 2015; Sarı, 2018). Examples include workshops like coding, robotics and object designing with

3D printers, which involve following certain process steps that do not allow students to employ processes like computational thinking and problem solving. This situation may lead to the perception that STEM education addresses the middle/upper segment of society in socio-economic terms. Of course, robotic applications and coding works can be part of STEM-focused learning environments in which the learning process is planned properly. This is because applications such as coding that contribute to computational thinking skills are very important for preparing individuals beyond the century we live in (Çorlu, 2017). However, they need to be planned as part of learning processes that are in line with the requirements of STEM education. On the other hand, the understanding that makes robotic applications inevitable can lead to the perception that STEM education addresses only the upper segments of society (Karahan, 2015). As a matter of fact, the applicability of STEM education to socio-economically disadvantaged groups is among the issues mentioned in the literature.

Socio-Economically Disadvantaged Groups, Social Justice and STEM Education

It is seen that studies in international literature have been recently emphasising the necessity of applying STEM education also to the disadvantaged segments of society instead of addressing only a specific segment. These studies are observed to deal with STEM education for disadvantaged groups (Lowrie, Downes & Leonard, 2018) or STEM education and social justice (Sondel, Koch, Carrier & Walkowiak, 2017).

Social justice is defined by the Turkish Language Institution (2018) as "The equilibrium provided in the social sphere by taking the measures of life standard, income level etc. in different parts of society into consideration within the framework of equality of opportunity". It is addressed in education in terms of dimensions like distribution (Gale, 2000; Gewirtz, 2006; Sturman, 1997), recognition (Gale, 2000; Gewirtz, 2006; Sturman, 1997) and participation (democracy) (Enslin, 2006). Distribution refers to the distribution of opportunities proportionately for everyone, and recognition refers to an education which includes all the groups that can be considered disadvantaged in terms of factors like race, socio-economic status and gender and which also ensures that they recognise the social structure that they live in. Participation means the configuration of education so as to help individuals to develop themselves and participate in social life. Since social justice in education promotes social rights and provides an opportunity for good education for all segments of society, this will strengthen

the political and financial situation and instil a hope of renewal in society (Alsubry & Shaw, 2005).

Some of the studies addressing STEM education from the framework of socio-economically disadvantaged groups and social justice are as follows: According to Scott (2017), although budget planning and economic infrastructure can prevent STEM education from reaching all segments of society, this should be overcome, and effectively educating the teachers of the future in universities is an important way to ensure social justice in STEM education. Wong, Dillon, and King (2017) reviewed government-issued reports on the objectives, management and financial resources of STEM education in the UK, and interviewed relevant people such as science, mathematics, engineering educators on the advantages and possible disadvantages of STEM education. The point to which the researchers drew attention the most at the end of this comprehensive study is that the structuring of the disciplinary courses of science and mathematics in order to improve STEM literacy is not compatible with industrial and political demands. In the study, the industrial need for individuals who have high literacy in STEM fields and who can specialise in these fields was evaluated together with the cost obligation that is entailed by an application of STEM education at all levels. In this situation, the applicability of STEM education for students in science and mathematics only after 16 years of age was considered as a suitable solution. Pointing out that this situation prevents the application of STEM education in a way that provides social justice, the researchers emphasise the necessity of carrying out more studies on how to implement STEM education so as to provide social justice. Parker, Pillai, and Roschelle (2016) organised a forum on "Next Generation STEM Learning for All" supported by the American National Science Foundation (NSF) and attended by STEM-related scientists, schools, politicians and the public in 2015. The researchers stated in the report they prepared after the forum that during all sessions the participants considered STEM education as a social justice issue. It is emphasised in the report, among others, that providing opportunities for creating STEM learning environments for generally underrepresented students in STEM fields (such as female students, disabled people, socio-economically disadvantaged groups, etc.) will contribute to social justice.

STEM education and social justice were also covered by the special issue of a magazine (Catalyst) in 2017 (Scott, 2017). Among the authors whose studies were published in that issue, Madden, Wong, Vera Cruz, Olle, and Barnett (2017) present a framework for applying STEM

education with a focus on social justice as an out-of-school program. The researchers point out that they are not sure how coding and robotics can provide social justice and they draw attention to the importance of their research on how to implement STEM education within the framework of social justice. In their study on the inadequacy of African Americans in STEM (Science, Technology, Engineering and Mathematics) fields, Bannister, Davis, Mutegi, Thompson, and Lewis (2017) emphasise regarding this failure in STEM fields that it is not sufficient to focus on the relationships among factors such as culture, race, power, class, learning preferences, cultural styles and language. In consideration of the necessity for STEM teacher educators and teachers to focus on the social situation of African-Americans when structuring pedagogy and other important factors like education content, the researchers provided a framework on how learning and teaching of mathematics can be carried out for this disadvantaged group.

When the concepts of social justice and STEM education are taken together, creation of learning environments suitable for STEM education for socio-economically disadvantaged groups and identification of student and teacher experiences in these environments are important in terms of contributing to the teachers and researchers who aim to prepare a learning environment suitable for STEM education towards disadvanteges students. In this study, a learning environment was created for regional boarding secondary school (RBS) students, one of the disadvantaged groups, and the views of practitioner teachers and students were presented. Boarding regional secondary schools were established in order to meet the educational needs of poor family children who have reached compulsory education age in settlements where the population is small and scattered (MoNE, 2003). Additionally, studies revealing that RBS students have low awareness about career options in STEM fields (Bozkurt Altan, Üçüncüoğlu & Zileli, 2019) show that the present study will contribute to the field in this sense as well.

In the present study, a science teacher who decided to improve themselves in STEM education after receiving in-service education planned a course unit in accordance with STEM education. It is believed within the context of this study that presenting the opinions of an experienced teacher who plans and implements activities for disadvantaged students will also contribute to the field in terms of the applicability of STEM education and the importance of teacher education. As a matter of fact, the desire of carrying out STEM education for everyone renders the education of teachers important. Various researchers also reveal the need for teachers and teacher candidates to carry out STEM education (Bozkurt Altan & Ercan, 2016; Hacıoğlu,

Yamak & Kavak, 2016, 2017; Han, Yalvaç, Capraro & Capraro, 2015; Üçüncüoğlu, 2018; Wang, Moore, Roehrig & Park, 2011). In their studies, Bozkurt Altan, and Ercan (2016), Çınar, Pırasa, and Paliç Sadoğlu (2016), Hacıoğlu et al. (2016, 2017) and Üçüncüoğlu (2018) reported that as the education and experience of teachers and teacher candidates about STEM education increase, their interest and abilities in this subject will also increase. Kınık Topalsan (2018) argued that STEM-educated class teacher candidates perform poorly in creating appropriate problems when developing teaching activities based on engineering design. Peterman, Daugherty, Custer, and Ross (2017) point out that although teachers receive education about STEM education, they do not have sufficient pedagogical knowledge about it. In this context, the tendency of teachers to develop themselves in the end of the education they receive may support the dissemination of STEM education and its applicability for disadvantaged groups. Teacher education will undoubtedly be important for teachers to prepare appropriate problem cases and to plan activities suitable for STEM education in their classrooms with simple materials.

The aim of the study is to identify the opinions of the regional boarding school (RBS) students and the practitioner teacher about STEM education experience.

Methodology

In this study, all stages such as determination of the study group, data collection process and data analysis were planned based on qualitative research methodology.

Study model

This study was planned as a holistic multiple case study, which is one of the qualitative research methods. There are multiple case in the holistic multiple case study desing, each case is evaluated and compared in its entirety (Yin, 2009). Within the scope of the study, the 8th grade "Living Beings and Life" unit was planned within the framework of STEM-focused activities. The aim was to identify the experiences and opinions of the practitioner teacher and the students. The multiple case examined in the study is the views of the RBS students and the practitioner teacher about STEM-focused activities. The results of the experiences of the

students and teachers were discussed together and it was aimed to reveal the experiences for the implementation of STEM-focused activities for disadvantaged students.

Participants

The study group of the research consisted of a science teacher and 34 Grade-8 students (18 female, 16 male) studying in a regional boarding school (RBS) in a Black Sea province of Turkey. The study group was determined by convenience sampling as one of the purposive sampling methods. The reason for selecting these regional boarding school students as the study group is that the students attending this school represent a disadvantaged group in terms of socio-economic status. All of the students in the study group are based in low-populated villages at least 40 km from the school and are boarding students. The average monthly income of their families is at or below the minimum wage. In this respect, in accordance with the STEM education and social justice context of the study, the RBS students formed the study group of the research. The teacher who conducted the STEM activities is a science teacher who has 8 years of experience including 7 years in the RBS. Before this study, the science teacher participated in a 60-hour education program consisting of theoretical and practical content for the theoretical basis of STEM education, application examples, and its application in science classes. Then the science teacher began to have graduate studies and took elective courses for interdisciplinary education. It is important that the teacher has both teaching experience for the disadvantageous group and STEM education in order to show that the study is in line with the objectives.

Context of Research

Within the scope of the research, STEM-oriented activities were planned in accordance with the acquisitions of the "Living and Energy" unit, which is the 5th unit of the 8th grade of the Science Education Program (2016). Within the scope of the study, the "Living Beings and Energy" unit, which is the 5th unit of Grade 8, was planned in accordance with STEM education. Seven different activities were prepared accordingly. The activities developed and the teacher guide drawn up to facilitate the implementation of the activities were presented as abstract submission (Köroğlu & Bozkurt Altan, 2017).

The activity development process was carried out as follows: Taking the structure and scope of the gains relating to the "Living Beings and Energy" unit into consideration, how the unit could be planned in accordance with STEM education was examined and a draft was drawn up. In this context, alternative activities were designed for one or more gains. All of these activities are aimed at preparing a STEM-focused learning environment with design-based learning, problem-based learning and project-based learning (Bozkurt Altan, 2017a, b). The general framework for the preparation of the activities is as follows: The problem situation including the knowledge and skills related to at least two of the STEM disciplines should be presented, the problem should be appropriate to the context of the students, the problem should have multiple solutions.

The suitability of the prepared activities to the STEM education concept was examined by 2 science education experts and 1 science expert who have experience in the field. The suggestions made included to enrich the integration of the disciplines (to integrate another discipline into the activity), to plan classroom time, and to make it a little easier to be appropriate to the level of the students, etc. The necessary corrections were made in accordance with the suggestions received and sent back to the experts for approval. The activities were examined by 1 Turkish Language teacher for an evaluation of expression. Corrections regarding language and expression were made accordingly. Information on the activities prepared for each / several learning outcome in the unit is presented in Table 1.

Table 1

The Content of "Living Beings and Energy" Unit STEM-Focused Activity Modules and Related Learning Outcomes

Learning Outcomes	Activity Name	Integrated STEM Disciplines
Students understand the producer-consumer-decomposer relationship in food chain, and give examples.	Daily Life and Food Chain	Science, Mathematics *(Problem-based Learning)*
Students comprehend the importance of photosynthesis in food production and explain how photosynthesis takes place. It is emphasised that photosynthesis also occurs in artificial light. They understand the importance of respiration in living organisms and explain how respiration occurs.	We Are Designing a Greenhouse	Science, Mathematics, Engineering *(Engineering design process)*
Students explain cycles of matter by showing them on a diagram. They question the importance of cycles of matter for life.	Cycles of Matter - Environmenta n Engineers at Work	Science, Technology, Engineering, Mathematics *(Engineering design process)*

Learning Outcomes	Activity Name	Integrated STEM Disciplines
They investigate the causes of ozone depletion and its possible effects on living beings, and produce and present suggestions for the solution of the problem.	The Top of the Earth Was Opened	Science, Mathematics *(Project-based learning)*
Students design projects for the efficient use of resources. Using research data, they discuss the importance of separating solid wastes for recycling and its contribution to the national economy, and offer solutions for this issue.	*Recovery Recovers the Future*	Science, Technology, Mathematics *(Engineering design process)*
Using research data, students discuss the positive and negative effects of current biotechnology applications. They research and report on the development of bio-technology applications from past to present.	Genetically Modified Organisms (GMOs)	Science, Mathematics *(Problem-based learning)*
Students research the groups of professions related to bio-technological studies, and explain the activity areas of these groups.	Professions Contest: The Professions of the Future	Science, Technology (Project-based learning)

Daily Life and Food Chain: In this activity, the students were presented with a newspaper report on the colour of Tuz Gölü (Salt Lake) turning red in certain periods of the year. Modelling the food web in the lake, the causes of redness and solution suggestions were discussed. Before presenting the problem case, real life problems were presented and researches were made to establish the context about food web, food chain and the producer-consumer-decomposer relationship. In one of the researches made in this context, the students were asked to take a photo of a living creature and form a food web consisting of at least 5 living creatures including the photographed one.

We Are Designing a Greenhouse: In this activity, the students were presented a problem case within the context of designing a greenhouse in accordance with real life contexts. They did group work in the activity. The design of the group which achieved the most successful solution in terms of all criteria was applied in the school yard. Mini design and research tasks were planned whereby the students would acquire the knowledge and skills they needed to acquire for this design that requires taking into account many factors such as the temperature, humidity, sunshine duration, respiration and photosynthesis in their districts.

Cycles of Matter - Environmental Engineers at Work: In this activity, a design problem was presented to the students, who were to plan a living space considering the important elements of the nitrogen, water and carbon cycle. They had to make an environmental decision to plan the living space in accordance with the criteria presented regarding all these cycles. Mini designs and researches were prepared for the students to gain knowledge and skills about the

water, carbon and nitrogen cycle. Two-dimensional models were built out of the design solutions they developed.

The Top of the Earth Was Opened: In this activity, a fictional story about the problems that may arise as a result of thinning of the Ozone Layer was presented and discussed. Then, the students were asked to design a digital story about the reasons of ozone depletion and their solutions. Information was given about digital story design and the criteria to be considered. The students' stories were evaluated with a rubric.

Recovery Recovers the Future: In order to establish the context in this activity, data on how the separation of wastes can contribute to the national economy were distributed and inferences were made on the data. Then, waste bags containing different types of solid wastes (plastic, paper, cardboard, plastic bags, etc.) were distributed to the groups and they were asked to separate and use them to develop products that can meet a need considering the criteria such as usefulness, aesthetics, etc.

Genetically Modified Organisms (GMOs): In this activity, the students are presented a few examples of the positive and negative consequences of bio-technology applications and these positive/negative aspects are discussed. The class is then divided into 2 groups to collect data on the positive and negative aspects of biotechnology applications. A discussion is made in the next lesson. The students are then presented with a problem case in which they must decide whether or not to use biotechnology applications. The problem case is planned to allow them to make decisions by analysing numerical data and looking at the subject from various angles.

Professions Contest - The Professions of the Future: Professional groups related to bio-technological studies were discussed and each group was asked to design digital stories in order to introduce these professions by storytelling.

The activities were conducted in the school classroom, computer lab and school yard. Some lecture hours were carried out in the computer laboratory for the students to conduct research. Each group has a computer. The activities were carried out with group work. In forming groups, the principles of group formation in collaborative learning were taken into consideration. The groups that were forced in the activities joined the other groups and completed the activities by

exchanging ideas where they were forced. While the students were working in the computer lab, they worked with group friends on a computer for 2 people. The computer laboratory is U-shaped. Some groups have completed their activities with the help of other friends and teachers in the areas where they have difficulty in doing research.

Data Collection Instruments

The data of the study were collected through the diary entries that each student wrote after carrying out STEM-focused activities and the field notes kept by the practitioner teacher. After each activity from the beginning of the implementation of STEM-focused activities, the students were asked to write a diary entry for the practice they performed on that day. No limitation was imposed regarding the diary-keeping of the students, and it was stated that they could address any factor such as the activity carried out, the teacher, individual and group performances, and their feelings and thoughts. During the process, each student prepared seven diaries. The practitioner kept the field notes on the basis of what skills the students employed in the activities and how their reactions were during the activities. The science teacher also noted the important points of the course because he was the person carrying out the process, and prepared field notes at the end of the course. The science teacher also prepared seven field notes.

Data Analysis

The data obtained from the students' diaries were subjected to content analysis, all diaries were examined separately by both researchers, and codes were formed. The two researchers came together, compared the compatibility and frequency of the codes, discussed their differences, and finalised the code scheme. Then, it was discussed in which themes the codes will be addressed and it was decided to address the evaluations of the students about the activity in the themes of *contributions to the process of learning, contributions to the development of 21st-century skills, contributions to the development of career awareness about STEM fields,* and *contributions to the perception about STEM disciplines* (See Appendix1 Analysis Framework of Students' Diaries). Field notes were also analyzed by content analysis. The issues stated by the teacher in the field notes were coded both by him and the other researcher. Themes were created from the obtained codes. Three of the themes were similar to those derived from the

analysis of the student diaries mentioned above. In addition to these themes, the theme of *difficulties experienced in the process* has emerged. (See Appendix2 Analysis Framework of Teachers' Field Notes).

Findings

Findings relating to the evaluations of the RBS students about their STEM education experience are given in Table 2.

Table 2

Findings about the Evaluations of the RBS Students about Their STEM Education Experience

Theme	Code	Frequency
Contributions to the Process of Learning (N=100)	Fun	33
	Connection to daily life	27
	Permanent learning	20
	Motivates to learn	20
Contributions to the Development of 21st-Century Skills (N=76)	Research and inquiry	21
	Group work	21
	Problem-solving skill	20
	Designing skills	14
Contributions to the Perception about STEM Disciplines (N=75)	Science and engineering relationship	16
	How do engineers work?	16
	How do scientists work?	16
	Science and mathematics relationship	15
	Engineering and mathematics relationship	12
Contributions to Developing STEM Career Awareness (N=30	Interest in engineering	17
	Interest in becoming a scientist	13

An examination of Table 2 shows that the evaluation of the RBS students about STEM-focused applications is mostly based on their contributions to the process of learning (N=100). It is followed by the contributions to 21st-century skills (N=76), contributions to their perceptions about STEM disciplines (N=75), and contributions to developing STEM career awareness (N=30).

The RBS students described the contributions of STEM-focused activities to the process of learning in terms of the activities being fun (f=33), their enabling to make connections to daily life (f=27), their enabling to learn permanently (f=20) and the problems being motivating for learning (f=20). The statements of some of the students who expressed their opinions on this theme are as follows:

> *"After we did these designs, I started to have a very good time in the class and became more interested in it. Everything was always fun… ",*
>
> *"It was fun for me to find a solution to a real event that can happen around us, and it attracted me to the course.",*
>
> *"I enjoyed doing the designs. We worked on problems that are actually relevant to our country. That was good."*

The RBS students, who evaluated STEM-focused activities as contributing to the development of 21st-century skills, stated that the activities contributed to the development of their skills of research-inquiry (f=21), group work (f=21), problem-solving (f=20) and designing (f=14). The statements of a few students who expressed opinions on this theme are as follows:

> *"Recycling was actually a difficult task, but we overcame it together with our group friends. We did a great job. We were good at completing a task together.",*
>
> *"I had a hard time setting criteria and constraints in the recycling problem. But now I can well distinguish criteria and constraints in a problem, and develop solutions."*

In their diaries, the RBS students stated that the process contributed to improving their perceptions of STEM disciplines. The students pointed out that they were able to make inferences about the science and engineering relationship (f=16), how engineers (f=16) and scientists (f=16) work, and the relationships between science and mathematics (f=15), and between engineering and mathematics (f=12). The views of a few of the students are as follows:

> *"When I worked like an engineer, I realised that engineers created new products for us by using the subjects of science. Greenhouse construction is an example. Photosynthesis is a science subject. Taking this into consideration, it is engineering to design a greenhouse according to the criteria at hand.*

"For example, we learn the importance of separating solid wastes and how to separate them for recycling. Engineers build recycling facilities using this information."

"An engineer can transform the facts determined by scientists into a product. The buoyancy of water is related to science. Engineers use this knowledge to design ships."

The contribution to developing STEM career awareness was another theme that the RBS students drew attention to in their evaluations about STEM-focused applications. At the end of the activities, the students mentioned their interest in engineering (f=17) and being a scientist (f=13). Here are a few student statements:

"This activity made me realise some problems and thus I both learned the problem and also how to solve it. For example, as I approach the problem about food chain, now I can better understand what this problem is and think better for a solution; perhaps one day I will be interested in science as well."

"I realised that I also like designing something."

In the field notes, it was determined that the observations of the teacher in the process were collected on the themes of *contribution to learning process*, *development of 21st century skills*, *STEM career awareness*, and *the difficulties experienced in the process*.

In the field notes, the *contributions to the learning process* are discussed within the framework codes of funning, connection to daily life, motivates to learning. The most frequently mentioned issue in the field notes was that those students who did not participate in the previous courses showed a noticeable participation in all courses in which STEM activities were applied. The activities have led to an increase in class participation. This situation is considered as code of motivates to learning. The science teacher stated this in a few notes as follows:

"The students named Student1 and Student2 had little interest in the course. They started participating in the course in these activities and Student2, who had learning difficulties, raised his hand many times to speak.",

"Student3 was a very quiet student, he didn't like to participate in the course, but when we were discussing a problem case about food chain, he raised his finger to give an answer and made a good comment. His behaviour surprised even his friends.",

> *"I was astonished to see Student4, a special education student, discussing with her friend about what happens when each of the living beings is removed from a food web. In the same way, Student 5 didn't used to participate in the course very much, but when I visited the groups, I saw that he was interested in it, too."*

In the field notes, the teacher frequently stated that the students enjoyed all STEM activities in the theme of contributions to the learning process and that they had great fun. This situation has been evaluated in the code of *fun* process within the scope of the theme of *contributions to the learning process*. The science teacher stated this in a few notes as follows:

> *"They asked for permission from a family in the village for entering their stables and coops and taking photos of cows, sheep and chickens. When they finally returned, they said they enjoyed it very much."*

> *"The most entertaining part was the one about 'let's rescue the Tuz Gölü (salt lake) from the redness".*

> *"The students enjoyed it very much. In fact, at the end of class, they said to each other how beautiful it was. They didn't even go out during the break time."*

It has been found that the teacher reflects his observations about the *students' connection with daily life* in the *theme of contributions to the learning process*. It was observed that the fact that the students were faced with problems from daily life improved their ability to associate what they learned with their daily life. Greenhouse design, for example, not only motivated them in the learning process since it is a context from their daily lives, but also led them to share their knowledge with their families. The statements recorded in the field notes are:

> *"Since some of the students had already seen greenhouses in their villages, they directly began design drawing. This subject caught their attention much because it was a subject that was around them; all of them were familiar with agriculture. They enthusiastically said that they would convey the information they learned to their families."*

The teacher notes in his field notes reflect his observations on the *development of group work, problem solving* and *design skills* in the theme of the development of 21st century skills. One of the facts frequently mentioned skills in the field notes is that group work developed in these activities although the students had not wanted to do group work, or they had had disagreements in previous activities. It is believed that this was because they realised that there was a need to do group work in the activities. This is stated in the field notes as follows:

"I had organized mixed groups including boys and girls. Not getting along well in group works, they objected to this as well. I said to them that the activities could only be done with group work. After the first activity, they were very friendly with each other and could listen to each other."

"Some students said that the best solution was theirs. But they were surprised when they saw that some of the other students in the group had very good ideas, and thus they began to care about the ideas of their friends in the group."

One of the skills that the teacher indicated in the theme of the development of 21st century skills was *design skills* improved during the process. It was noted that, after the first activity, they did not experience any problems about determining criteria and constraints, and that they showed improvement in issues such as finding solutions and choosing the best according to criteria and constraints.

"In the recycling activity, they operated the design process so well that I observed that they discussed each solution feverishly in accordance with the criteria and constraints."

One of the skills that the teacher indicated in the theme of the *development of 21st century skills* was the *problem solving skills*. One of the important observations was that students were now able to understand problems better and carry out problem-solving processes faster. The practitioner expresses this situation in the field notes as follows:

"Today in our third activity, unlike the previous ones, they can immediately understand the problem case and make inferences about what are wanted. In fact, I've seen that the groups can quickly suggest many solutions."

It was determined that the teacher's field notes reflect his observations on the development of *interest in engineering* in the theme of *STEM career awareness*. It was stated in the field notes that the students can develop awareness about the profession of engineering as implied by the fact that they did not fail to ask during design and technology activities which fields of engineering were concerned with those activities.

"After the greenhouse activity, they asked me whether environmental engineers or agricultural engineers did this job, and I discussed it with them."

"In the recycling activity, they asked which engineers were involved in the building of separation mechanisms."

In the field notes, it was found that the teacher made observations within the scope of the *difficulties experienced in the process* within the scope of the *mathematical skills* of students and *the negative impact of academic achievement*.

It is indicated that the activities in which mathematics integration was carried out such as table interpretation, graphic examination, model building, and proportional reasoning were the parts in which the students had the hardest time. It is even noted that there were some students who said they were bored when they faced that subject.

> *"In our activity, they had trouble when mathematics was concerned. Some students had difficulty in that part, and two groups were united to try to solve it."*
> *"What they had to do about mathematics was table interpretation but I think they have prejudices because they said they had difficulty with it."*

An important point in the field notes was that a few students with high *academic achievement* did not want to participate in the first activities. It was found that they initially wanted to solve tests but subsequently began to enjoy the activities in the process. An exemplary statement in the field notes is as follows:

> *"I couldn't fully understand why some very good students in the class remained passive in the first activity. The activities were different from what they had been used to so far; they seem to be afraid of not being successful."*

The matters pointed out in the field notes included the fact that the students' course participation and their skill of group work improved, that they had fun in the course, that their motivation was raised, that they were able to associate what they learned with their daily life, that their problem-solving and design skills improved, and that their awareness about engineering enhanced. It was also found that the students who were successful in the course were less enthusiastic than others at the beginning of the process and that the students had difficulty in matters involving mathematics integration.

Discussion and Conclusion

The RBS students were found to think that STEM-focused activities contributed to the improvement of their learning process, their 21st-century skills, their perceptions of STEM disciplines and their

STEM career awareness. According to the RBS students, the activities contribute to the learning process because of their being entertaining, suitable for their making connections to daily life, providing permanent learning, and motivating. They also believe that their 21st-century skills such as research-inquiry, group work, problem-solving and designing have also developed through these activities. The RBS students evaluated STEM-focused activities to be contributing to their ability to make inferences about the science and engineering relationship, how engineers and scientists work, and the relationships between science and mathematics, and between engineering and mathematics. Furthermore, they were found to think that the activities contribute to their interest in being an engineering and scientist. The findings obtained from the practitioner's field notes, which support this result, show that the course participation and the group work skill of the students increased, that they had fun and became motivated in the course, and that their awareness about engineering enhanced along with the improvement of their skill of associating what they learned with the date life and the skill of designing. Besides, it was found that the students who were successful in the course were less enthusiastic than other students at the beginning of the process and had difficulty in issues involving mathematics integration.

The RBS students stated that their perception and career awareness regarding STEM fields improved. It was also identified through the field notes that the students asked questions about branches of engineering and that they were interested in engineering. Muro and Kottman (1995) report that the secondary school period is important for children to gain awareness about professions. This result of the study indicates the importance of the contribution of the applications to students. As a matter of fact, there are studies indicating that STEM awareness of disadvantaged students is insufficient in the literature (Bozkurt Altan, et al., 2018). Karcı (2018) showed that STEM-focused activities do not increase students' interest in STEM professions in a low socio-economic region. Gülhan and Şahin (2016) found that STEM activities were effective in improving STEM perceptions and attitudes of 5th grade students. In this respect, it can be suggested that the literature should be enriched by making applied studies for socio-economic disadvantaged groups.

The field notes also confirm that the students evaluated STEM-focused activities to be supporting their 21st-century skills like research-inquiry, group work, problem-solving and design. The field notes also concluded that an improvement was observed in group work, problem solving and design skills. Considering the importance of raising individuals with 21st-century skills (Bybee, 2010), it is important to obtain these outcomes for disadvantaged groups. This result is limited in the views

of teachers and students. Detailed analysis of all developments can be recommended with various measuring tools.

The field notes also support the fact that the RBS students consider STEM-focused activities to be contributing to their learning process (their being entertaining, suitable for their making connections with daily life, providing permanent learning, and motivating). Likewise, the field notes conclude that the course participation of the students increased, they found the course to be entertaining, their motivation raised and an improvement was observed in terms of their making connections to their daily life. It is believed that the fact that the problems are compatible with the context or the actual life of students is influential on their being motivated for the courses and their ability to utilise their learning for solving their daily life problems. Parker, et al. (2016) point out that opportunities to create STEM learning environments in STEM fields for disadvantaged groups can make contributions suitable to their contexts, even if they do not develop academic knowledge in STEM fields. In this sense, the fact that students project their learning to their real lives is an important result of this study. The importance of problems appropriate to the context and life can be highlighted as another point. The students had difficulty when they needed to use mathematics skills. In order to overcome this problem, it may be suggested that mathematical problems which are based on real life (Karahan & Bozkurt, 2017) are studied with disadvantaged students. Another result of the study is that students with high academic achievement were shy during the initial activities. This situation is believed to result from their cautious approach to the process of solving problems which they are not used to.

Research that suggests the need for teachers and prospective teachers to carry out STEM training indirectly supports the findings of this research (Bozkurt Altan & Ercan, 2016; Hacıoğlu et al., 2016, 2017; Han et al., 2015; Üçüncüoğlu, 2018; Wang et al., 2011).As a matter of fact, the STEM-focused activities carried out in an RBS which is located in a mountain village were carried out with simple materials, and the positive evaluations made in the students' diaries and the field notes indicate that the application was efficient. It can be stated that the role of the teacher is important for STEM-focused activities towards disadvantaged groups. In support of this result, Scott (2017) draws attention to the fact that the budgetary barrier preventing STEM education from reaching all the segments of society should be overcome and that teachers are essential for ensuring social justice in STEM education. It can be suggested for teacher educators to enrich the studies on the development of action plans for disadvantaged groups by STEM-educated teachers. In parallel, Wong et al. (2017)

argue that configuration of science and mathematics courses, which have a disciplinary structure, so as to improve STEM literacy is incompatible with industrial and political demands (budget). Stating that this situation impedes the application of STEM education in a way to ensure social justice, the researchers suggest that STEM education activities should be enriched for disadvantaged groups.

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Appendix 1. Analysis Framework of Students' Diaries

Theme	Codes
Contributions to the Process of Learning	• Fun • Connection to daily life • Permanent learning • Motivates to learn
Contributions to the Development of 21st-Century Skills	• Research and inquiry • Group work • Problem-solving skill • Designing skills
Contributions to the Perception about STEM Disciplines	• Science and engineering relationship • Engineers working process • Scientists working process • Science and mathematics relationship • Engineering and mathematics relationship
Contributions to Developing STEM Career Awareness	• Interest in engineering • Interest in becoming a scientist

Appendix 2. Analysis Framework of Teachers' Field Notes

Theme	Codes
Contributions to the Process of Learning	• Fun • Connection to daily life • Motivates to learn
Contributions to the Development of 21st-Century Skills	• Group work • Problem-solving skill • Designing skills
Contributions to Developing STEM Career Awareness	• Interest in engineering
Difficulties experienced in the process	• Mathematical skills • The negative impact of academic achievement

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Research Article

Evaluation of Teachers' Views on School Managers' Classroom Supervision

Müyesser Ceylan[1], Sevcan Can[2]

Abstract

In this study, it is aimed to evaluate teachers' opinions on school principals' classroom supervision task in schools. The study group of this research in which phenomenological model among qualitative research methods was used consists of 8 teachers working in Tepebaşı district in Eskişehir and chosen by means of convenient sampling among purposeful sampling methods. The data obtained using semi-structured interview technique were analyzed using descriptive and content analysis techniques. The results indicate that teachers used metaphors such as "waste, dinosaur, torture, divine comedy, yield meter, Tüvtürk periodical vehicle examination, tea spoon in the glass of someone who does not use any sugar, and detective". Most of the teachers stated that the school principal's role in the course supervision process should be guiding. It was found that none of the teachers thought that school principals could effectively perform their supervisory roles. The results also show that teachers appreciated the application in terms of its effectiveness since it motivated teachers to be prepared for the lessons, to be planned, programmed, to transfer their experience, and to take responsibilities. On the other hand, it was mostly criticized for the unnecessary paperwork, favoritism and discrimination, stress, and reaching wrong judgments due to lack of time. In addition, the majority of the teachers stated that the course supervision should be done by the teachers of the field at issue. In the study, it was concluded that the teachers who do not evaluate the classroom supervision process performed by school administrators as professional do not consider the supervision process as necessary. In general, the study suggests that the supervision should be done by individuals who have a modern understanding of supervision and who are experts in guidance and counseling.

Keywords: *Lesson supervision, school principal, teacher*

[1] Asst. Prof., Anadolu University, Faculty of Education, Department of Educational Sciences, mceylan@anadolu.edu.tr, https://orcid.org/0000-0001-7830-2584

[2] Teacher, Habip Edip Törehan Mesleki ve Teknik Anadolu lisesi, sevcancanpangal@gmail.com, https://orcid.org/0000-0002-7797-4087

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Okul Müdürlerinin Ders Denetimine İlişkin Öğretmen Görüşlerinin Değerlendirilmesi

Öz

Bu çalışmada, okul müdürlerinin okullardaki ders denetim görevine ilişkin öğretmen görüşlerini değerlendirmek amaçlanmıştır. Nitel araştırma yöntemlerinden olgu bilim (fenomenoloji) deseninin kullanıldığı bu araştırmanın çalışma grubunu, amaçlı örnekleme yöntemlerinden kolay ulaşılabilir örnekleme yöntemi ile belirlenen Eskişehir ili Tepebaşı ilçesinde görev yapan 8 öğretmen oluşturmaktadır. Yarı yapılandırılmış görüşme tekniği kullanılarak elde edilen veriler, betimsel analiz ve içerik analizi tekniği kullanılarak analiz edilmiştir. Araştırma sonuçlarına göre, öğretmenlerin ders denetimine ilişkin olarak " fuzuli, dinozor, işkence, ilahi komedya, verim ölçer, Tüvtürk araç muayenesi, şeker kullanmayan birinin bardağındaki çay kaşığı, dedektiflik" gibi metaforlar kullandıkları görülmüştür. Öğretmenlerin çoğu, ders denetim sürecinde okul müdürünün rolünün rehberlik etme yönünde olması gerektiğini belirtmişlerdir. Tüm öğretmenlerin okul müdürlerinin denetim rollerini etkili bir şekilde sergileyemediklerini düşündükleri tespit edilmiştir. Ders denetimlerinin derse hazırlıklı gelme-planlı, programlı olma, tecrübe aktarımı, sorumluluk kazanma açısından kendilerine katkısının olduğu belirlenmiş, gereksiz evraklar, kayırma ve ayrımcılık, stres, zaman yetersizliğinden kaynaklı yanlış yargılara ulaşma gibi olumsuz etkiler de yarattığı öğretmenler tarafından ifade edilmiştir. Ayrıca öğretmenlerin çoğunluğu ders denetimlerinin zümre öğretmenleri tarafından yapılması gerektiğini belirtmişlerdir. Araştırmada okul yöneticilerince gerçekleştirilen sınıf içi denetim sürecini profesyonel olarak değerlendirmeyen öğretmenler denetimi bu haliyle gerekli görmedikleri sonucuna ulaşılmıştır. Öğretmenleri sınıf içerisinde denetleyecek kişilerin çağdaş denetim anlayışına sahip, rehberlik ve danışmanlık konularında uzman kişilerin olması bu araştırmanın genel önerisidir.

Anahtar Sözcükler: *Ders denetimi, okul müdürü, öğretmen.*

Introduction

Countries are trying to achieve their goals by creating well-structured and well-functioning systems and one of the most prominent ones is the education system. In other words, like in any other system, in education systems, aspects such as process operation and sustainability gain importance as well as the structuring processes. As an important point here, the management and supervision processes emerge. According to Başaran (2000), supervision is universal and there is a supervision process in all organizations regardless of their type, purpose and organization. Supervision, a sub-system of management, is a process that provides feedback to systems and exists in all organizations since controlling the process is considered to be an organizational and administrative necessity (Aydın, 2014). However, a critical point emerges when the terms used for this process are examined. Although the concepts “control” and “supervision” may sometimes be used synonymously, they function differently when used in the process of evaluation of a system.

For the concept “control” there have been many different definitions used so far and there has been some ambiguity in the related literature as well. As stated above, the concept is occasionally associated with some terms, such as "inspection" and "supervision" which do not fully meet the meaning of “control” most of the times. Control mostly focuses on identifying the problem rather than solving it whereas the focus of supervision is improvement, which comprises terms feedback, guidance and counselling in return. According to Bursalıoğlu (2013), supervision is a method of controlling the behavior in the public interest. Aydın (2014), on the other hand, defined supervision as the process of determining whether or not organizational actions are in line with accepted principles and rules. Supervision is also defined as a wide range of services, such as supervising and evaluating the work done, making recommendations to those involved, to make them more efficient, and assisting staff in institutions throughout their work and progress (Taymaz, 2002). Supervision in education system is mostly done by comparing the existing practices in the education system, detecting unwanted deviations from the objectives, revealing the causes of deviations and directing them in order to eliminate the existing and possible problems which may arise during the process (Bursalıoğlu, 2003; Başaran, 2000). Besides, the aim of supervision in education is to find the methods appropriate to the aims of education and training, to ensure progress in the process by

taking quality and quantity issues into consideration (Atay, 1996), to wit, to confirm that all students learn by increasing the quality of education and training performed in the classroom. At this point, supervision activities, which are considered as a part of professional development, are evaluated as a guidance-centered process that continues periodically to support development, providing feedback and increasing teachers' knowledge and skills (Başaran, 2000; Eren, 1993, p. 404). Education supervision helps to achieve the objectives of education as a sub-system of educational management. With this feature, supervision is of great importance for educational organizations.

There have been significant changes in the historical process in the sense of educational supervision. In parallel with the understanding in management, educational supervision was initially implemented with an understanding that focuses on reducing and correcting the mistakes of the education system and restricting the educators to only do what they need to do, and on the identification and elimination of deficiencies (Sergiovanni and Starrat, 2007; Sullivan and Glanz, 2005). As a result of the evolution in the understanding of educational supervision, contemporary supervision approaches started to put the emphasis on the process of education and teacher development; thus, guidance and professional assistance began to be discussed in the 2000s. In the new paradigm, participation, collaboration, research and evaluation based supervision practices are highlighted. Accordingly, the contemporary understanding of system control would require a participatory and interactive assistance process with emphasis on human relations, and consequently, a leadership role has been undertaken to improve the quality of education and training in the school, help teachers in their progress and facilitate students' learning (Kowalski and Brunner, 2005). In this sense, supervision is very important in making schools a more effective learning environments.

Especially novice teachers, who have graduated from university with a certain level of general, pedagogical, theoretical and methodological knowledge, may experience difficulties in putting the theoretical knowledge into practice in real classrooms when faced with complications (Budak and Demirel, 2003). Most of the time, they try to upgrade their teaching skills by means of their own experiences and efforts. It is important for the teacher development that supervision provides teachers with vocational guidance in this respect, and in some way, gives them the opportunity to be trained in the workplace. One aspect of the guidance function of supervision is that it allows to keep up with change. To be more precise, it serves the system

in its never ending adaptation process since the rapid changes in the needs of societies require the education systems to be dynamic. Aydın (2014) states that the knowledge and skills acquired in schools cannot be kept up to date in the face of rapid changes, and as a matter of fact, they become out of date. This phenomenon necessitates continuous self-renewal in teaching as in every profession. As a result, pioneers strongly suggest that teachers who are confronted with such a social phenomenon should not be left on their own.

Both in Turkey and around the world, teachers' supervision and development have gained importance; however, the existing models have been criticized for not being as effective as expected, and suggestions for new models have been tried to be developed in order to facilitate the process. More specifically, the discussions on practices are largely about the persons and institutions involved in the audit, the supervisors' cooperation with teachers and communication process (Yavuz & Yıldırım, 2009; Aksu & Mulla, 2009; Yaman, 2009; Samancı, Taşçıoğlu, & Çetin, 2009; Beycioğlu & Dönmez, 2009). In relevance with one of mostly directed criticisms, it is of great importance for the teacher to be evaluated correctly and impartially in the professional development process and to be guided towards self-development. Therefore, in order to evaluate and improve teacher performance in a realistic way, data on this subject should be collected from various people and sources. However, current practices are considered to be insufficient to evaluate teachers' performance and to guide them through the process. In the light of the discussions on supervision, it can be said that supervision and professional development should be done in a complementary process. In other words, it is suggested that teachers, who are the main object of the supervision, should no longer be in a passive position in the supervision process and subject to a mechanical supervision in a narrow process.

Supervisions applied to ensure the effectiveness of schools with economic, political and social functions are carried out as institution supervision and course supervision in the Turkish education system. The supervision of the institution comprises the examination of all activities held in the educational institutions; thus, it is more concerned with the management of educational organizations and the monitoring, control and evaluation of human and substance resources, utilization and utilization of human and material resources, and it is carried out in order to achieve the objectives of the educational organization. Lesson supervision, on the other

hand, is the observation, examination and evaluation of the activities of teachers who work as instructors in an educational institution (Taymaz, 2002). In Turkey, education supervision activities are carried out by inspectors. Article 57 of the Regulation on the Presidency of Guidance and Inspection of the Ministry of National Education and the Presidency of Inspectors of Inspectors, which entered into force on 24.05.2014, includes the duties stated in Article 17 of the Decree Law No. 652. In the related article of the Decree Law No. 652, the tasks of inspecting the teacher activities in the classroom is not mentioned specifically. As a result, the inspection of the institutions would continue to be carried out by the inspectors, yet with the implementation of the new regulation the inspectors would no longer participated the course inspections regularly unless a problem is reported. In order to fill the gap of lesson supervision, school principals were assigned for this task (The Ministry of National Education, Teacher Appointment and Relocation Regulation, Article 54) in April 17, 2015 announced in the Official Paper, stating that " At the end of each course year, for the sake of measuring their success, productivity and efforts, the evaluation of the teachers, who are working in all degrees and types of educational institutions and who have completed the candidacy phase, is done by the school principal of the educational institution where the teachers are working."

As a result of the abovementioned changes done in Turkey's education system, the tasks appointed to the principals have changed, and the major factor of incorporating them in the supervision process as well as the management one is that they have been considered to be education leaders in the new paradigm. In this respect, the school principals, as education leaders, should supervise the teaching activities in the classroom and make necessary applications and organizations in order to improve the teaching activities at issue. In other words, school principals would need to establish a close and active relationship with teachers who they are working with. Therefore, all these developments increase the importance of supervision activities to be performed by school principals (Yılmaz, 2009).

Increasing the effectiveness of the principal in course supervision is a matter of discussion in the current literature because, first, assigning the school supervision role to school principals is a new issue, thus, some ambiguity may arise in the process, and second, this may have some disadvantages besides its advantages, such as the principal's not having any special training for the supervision, the teachers' being the principal's colleague or the lack of objectivity in the supervision process. The most significant positive side, on the other hand, is considered to be

the principle's being more accessible than a supervisor appointed by the Ministry of Education. In this research, it was aimed to determine the teachers' views about the principals regarding their course supervision task in schools. By examining teachers' views about school principals' supervisory role it was aimed to help to fill the research gap in this area. Furthermore, considering that there are limited number of studies on this subject, all kinds of research data will contribute to this subject.

Aim of the Study

In this research, it is aimed to reveal teacher opinions about the school principals' lesson supervision task. For this purpose, the following questions were sought:

According to the teachers,

1) what is course supervision?
2) what role should the school principal have in the course of the supervision?
3) what are the contributions of the school principal's carrying the supervision task to the teacher?
4) who should take charge of course supervision in schools?

Methodology

This qualitative study done by taking phenomenological design into consideration aimed to examine teachers' opinions about the principal's course supervisory task and their role in the supervision process. The phenomenological model focuses on cases that we are aware of, yet do not have in-depth and detailed understanding of. According to Yıldırım and Şimşek (2006, p.113) the aim of phenomenological studies is to reveal individuals' experiences and perceptions about a case and meanings they attributed to it.

Participants

Eight teachers working in Tepebaşı district in Eskişehir, Turkey constitute the study group. While presenting information about teachers, the confidentiality of the participants was ensured

by coding them as T1, T2,…, T5. Demographic characteristics of the teachers in the study group are given in Table 1.

Table 1

Demographic Characteristics of Teachers in the Working Group

	Gender	Age	Year of Experience	Subject	Education
T1	Female	27	5	English	BA
T2	Male	32	10	Turkish	BA
T3	Female	35	5	Music	BA
T4	Male	29	5	English	BA
T5	Female	26	2	English	BA
T6	Male	33	8	Mathematics	BA
T7	Male	31	7	Social Studies	BA
T8	Female	31	8	Philosophy	BA

As shown in Table 1, four of the teachers in the study group were male and four were female and their ages were between 26 and 35. Their professional seniority is between 2 and 10 years. It is seen that three of the teachers in the study group are English teachers, and there is one teacher for each of the subjects: Turkish, Music, Mathematics, Social Studies and Philosophy. All teachers are undergraduates.

Data Collection Tools

A semi-structured interview form developed by the researchers was used as data collection tool. In the semi-structured interview technique, the researcher prepares the interview protocol containing the questions he / she plans to ask in advance. The most important convenience that the semi-structured interview technique offers to the researcher is that it provides more systematic and comparable information because the interview is conducted in accordance with the pre-prepared interview protocol (Yıldırım & Şimşek, 2006). The semi-structured interview technique provides a certain standard and flexibility at the same time, especially for educational science researches (Türnüklü, 2000). While creating the semi-structured interview form, the related literature was scanned in detail. Moreover, various questions were asked about how teachers evaluated the school supervisory task and expert opinion was applied. As a result of the expert examination, the questions in the interview form were rearranged and after the

necessary arrangements were made on the missing questions so that they became appropriate, understandable and applicable in terms of being a data collection tool.

Data Collection and Analysis

The research data were collected through semi-structured interviews done by consisting five open-ended questions asked to the participants. The interviews were conducted one-to-one with each participant. Supported with follow up questions, the interview with each participant lasted approximately 90 minutes. Descriptive and content analysis techniques were used while analyzing the obtained data. In the descriptive analysis, the findings that identify the subjects are evaluated and the summarized and interpreted data by the descriptive analysis are subjected to a deeper process in the content analysis. In this phase, the concepts and themes that cannot be noticed by the descriptive approach can be discovered by means of content analysis techniques. The basic process of content analysis is to bring similar data together within the framework of certain concepts and themes and to interpret them in a way that the reader can understand (Yıldırım & Şimşek). After the data were transcribed, analyzes were performed with a qualitative data analysis program. In this process, the researchers first made independent coding and then worked together until an agreement was reached. After the coding key was revealed, the reliability study process was completed with the third expert's opinion. The codes were determined by the abovementioned analyses, and by taking the codes account, sub-themes were created. Direct quotations are included to reflect the views of the participants as they are. During the presentation of the findings, direct quotations were made for teachers and teachers were coded as T1, T2, T3, etc.

Findings

In this study, which aimed to determine teachers' views about principals' course supervision tasks, the findings are discussed in accordance with the sub-objectives of the research. Within the scope of the research, five questions were asked to the teachers and their answers were presented depending on the purpose of the research. The first question which was directed to the teachers was: "If you would use a metaphor, what concept would you use for course

supervision? (How do you perceive course supervision? What does it stand for in your mind?) Explain with the reasons.

The themes of the teachers' answers to this question are given in Table 2.

Table 2.

Metaphors Used for Supervision

Sub Themes	Participants
Waste	T1
Dinosaurs (Something that does not exist anymore)	T2
Torture	T3
Divine Commedia	T4
Yield Meter	T5
Tüvtürk periodical vehicle examination	T6
A spoon in someone's glass who does not use sugar	T7
Detective	T8

When Table 2 is examined, it can be seen that teachers produced metaphors such as "superfluous, dinosaur, torture, divine comedy, yield meter, Tüvtürk vehicle examination, teaspoon in the glass of a non-sugar user". Direct quotations from some of the teachers' views on this subject are as follows:

> *"I see supervision as a redundant business. It's impossible to understand a teacher in 40 minutes. Actually, our headmasters cannot do that anyway." (T1)*

> *"Supervision is an extinct concept like dinosaurs. I think, there hasn't been any supervision done for a long time". (T2)*

> *"Divine Comedy. The tragicomic situation which teaching is dragged into. It's like a butcher checking a grocery store. There should be supervision for sure, but it should be carried out by experts who have completed their development with a certain experience in the field and branch to be supervised". (T4)*

> *"Evaluation process – For me it is the evaluation of the course efficacy which enables to observe both student achievement and teacher success". (T5)*

> *"We can draw a parallel with Tüvtürk vehicle inspection. It is done routinely. If the vehicles are unproblematic, they pass smoothly. On the other hand, the problematic vehicles can also pass with small reparations which will show the vehicles as unproblematic, eventhough they are, so that they can go through that examination,*

but in the end, every vehicle passes. Lesson supervision is the same, if the teacher is doing his job well, the supervision goes smoothly, and if he doesn't do his job well, he does it well and the supervision goes smoothly again". (T6)

"Maybe we can call it investigation, what detectives do. But I even don't believe that class supervision is exactly what detectives do. For the sake of the procedure, only administrators are allowed in the process. Thus, an administrator who is not proficient in a branch only witnesses a certain part of the teaching process and cannot contribute effectively. It is done just because it is assigned, thus, not effectively at all". (T8)

It can be said that the teachers' participation in the research is usually related to negative metaphors due to the lack of supervision practices in the classrooms.

As the second question to the teachers in the research, "What should be the role of the school principal in the course of supervision? (guidance-professional assistance, evaluation of the quality of education and training activities, control, etc.) Please explain the reasons. " was asked to the participants. In addition, as the third question of the research, in order to obtain more detailed information on this subject, "Do you think the school principal can perform the supervisor roles effectively? Please explain the reasons." was asked. The themes of the teachers' answers to these questions are given in Table 3.

Table 3.

The role of the School Principal in the Classroom Supervision Process

Supporting supervision and professional help
Encouraging
Motivating
Increasing student success (Increasing the education quality)

When Table 3 is examined, it can be seen that the teachers stated that the roles that the school principal should undertake in the course of supervision should be guidance and vocational help, encouragement, motivation and increasing the quality of education. The views of some teachers on this subject are as follows:

"There might be guidance and professional assistance. He can share his experiences." (T1)

"Certainly, it should aim to guide. He knows a lot more than us, and he should be guiding us in expressing our shortcomings or pros". (T3)

"It should be guiding and encouraging. The focus needs to be teacher motivation. Student achievement is of course a tool for the supervision of the teacher". (T5)

"An experienced, active and innovator-aware manager can be more effective in the process by guiding it a little further, but I believe that teaching is a profession with a personal approach, idealism. That is, the administrator cannot at least place this idealism in the course of his supervision. I think the course supervisions have a temporary effect". (T8)

In the research, the fourth question was, "How do you think the school principal contributed to you during the course supervision? Explain the positive and negative effects with the reasons."

Table 4.
Positive And Negative Effects of the School Principal's Supervision Process

Positive Sides
Being prepared for the class (Having a plan and being programmed)
Sharing and transferring experience
Taking responsibility
Negative Sides
Unnecessary documentation
Competence and discrimination
Stress and anxiety
Making wrong judgments due to insufficient time

When Table 4 is examined, it seen that the teachers believe that school principals contribute to the process, such as by having teacher be prepared for the lesson, transferring experience, gaining responsibility and doing their job with care. However, the teachers stated that lesson supervision has negative effects such as creating unnecessary piles of documents, merit and nepotism, creating stress and tension, and making wrong judgments due to insufficient time. The views of some teachers on this subject are as follows:

"We understand how important documents are. I also learned that taking notes in the guide books is helpful in preparing for the lesson. This is actually the only benefit I can spell". (T1)

"Positive past experience is very useful and decision-making is easier. On the other hand, in this system, merit and nepotism are seen in many principals". (T2)

"I don't think it adds anything other than extra excitement. Both teachers and students experience unnecessary tension". (T3)

"Everyone should do their own work. Do you think an administrator can have sufficient knowledge in every field? Or can this administrator be guided in every field?" (T4)

"I don't think that course supervisions add anything other than being a little more careful in the work and operations to be done depending on the annoying share of being supervised". (T6)

Teachers believe that school principals contribute to the supervision process through their experiences. However, it can be a disadvantage that school principals provide guidance to all teachers as teachers' professional knowledge and that their field expertise is different from each other. Each teacher cannot help everyone at the same rate due to different branches.

As the fifth question of the research, the teachers were asked about whom the supervision should be done. (School principal, colleagues, group teachers, commissions, supervisors, etc.) The themes obtained from the teachers' opinions are given in Table 5.

Table 5.

Who should do the course supervision?

Teachers who teach the subject at issue
Professional supervisors
Independent professionals or professional organizations
Principals
No one

When Table 5 is examined, it is seen that teachers want to be supervised by group teachers, expert supervisors, independent persons and institutions and school principal respectively. A teacher thinks that there should be no supervision. The views of some teachers on this aspect are as follows:

"It should be done by independent persons and institutions. For example, university students can do it with the help of an associate professor". (T2)

"Experts.. what I mean by experts is teachers who have reached a certain level of experience and proficiency.. they should be in charge while supervising ". (T4)

"Group teachers support each other with the contribution of joint exams. In addition, since the group teachers have mastered the skills of that course, they will know better what to look for in the supervision. Therefore, the group teachers can take on both supervisory and supportive tasks". (T5)

"If the course is to be supervised, it should be done by a commission consisting of a group of teachers. To explain the reason.. let's think that the supervisor is originally expert in social sciences and he or she investigates an English language classroom. I don't think that the supervisor can be objective effective in this process. I don't think that a supervisor can be supervise the course without even knowing that foreign language." (T6)

"It is most appropriate to be done by group teachers. During the supervision, the process can teach different techniques and methods to the teacher. The person who performs the supervision can learn by seeing different techniques and methods". (T7)
"If the course supervisions want to achieve their purpose, each branch should have its own supervisors. They should do so with a dynamic and questioning approach that is competent and proven in their fields. Ministry inspectors can carry out course inspections". (T8)

The majority of the teachers stated that they should supervise themselves.

Discussion and Conclusion

In this research, it was tried to put forward the opinions of the school principals about the supervisory duties in the schools. From the current supervision approach, which has been implemented in Turkey, it is expected to be carried out in accordance with the objectives of the training program and evaluate teacher performances. One of the most important tasks assigned to school principals is to train teachers on the job and make them more qualified. School principals are the ones who know the teachers better than anyone else and know what is expected of them as long as they are in contact with the teachers. Therefore, if the opportunities are used correctly, they can help the professional development of each teacher and increase the success of the teacher, and as a result of this, supervision can help to increase the quality of education. In this context, the task of evaluating and improving the teacher assigned to school principals in the existing system is of great importance. The school principal, who foresees a change in the behaviors of teachers regarding education and training, should evaluate their

expectations correctly (Bursalıoğlu, 1980) and determine the successful and unsuccessful aspects of the activities (Taymaz, 2000).

As a result of this research aiming to determine the opinions of teachers about the supervision of school principals, it was seen that teachers produced metaphors such as "waste, dinosaur, torture, divine comedy, yield meter, Tüvtürk vehicle examination, sugar spoon of a person who does not use sugar". All of the metaphors used by teachers seem to have negative meaning. As can be seen from this, teachers approach the concept of supervision and the supervision process negatively. Memduhoğlu and Mazlum (2014), as a result of their study investigating the stakeholders of education as supervisors, administrators and teachers, aiming to determine the metaphoric perceptions of educational supervisors, stated that perceptions about supervision and the supervision of education have changed significantly since 10 years, but they are not sufficient enough. As far as the teachers' opinions are concerned, school principals either do not fulfill the task of supervising the courses at all or they fall short because of lack of time, lack of expertise in the field and so on for effective reasons. Therefore, it can be stated that this insufficiency may have affected teachers' opinions negatively.

Another finding of the study is that the role of the school principal in the course supervision process should be guiding, encouraging, motivating and improving the quality of education. In addition, it was found that all teachers felt that school principals could not effectively demonstrate their supervisory roles. According to the research findings of Firincioglu Bige (2014) which was held to determine the teachers 'opinions about primary school principals' course inspections, the expectations of teachers from course supervisions are in order of importance; "Guidance, feedback, completion of material deficiencies, determination of professional deficiencies, reward-appreciation and increased quality of education". The findings obtained are similar to the results of Firincioglu Bige's research.

In the research, it was concluded that the course inspections have negative effects, such as unnecessary documents, favoritism and discrimination, stress, and reaching wrong judgments due to lack of time, in addition to contributions such as coming-planned, being programmed, transferring experience, and gaining responsibility. In the study conducted by Yeşil and Kış (2015) in order to determine the teachers' opinions about school supervision tasks in the schools, it was seen that the teachers reported that the school supervision contributed to the

teacher. It was found that the most contribution of the course inspections was to see the deficiencies of the teachers. In the research conducted by Karabay (2014) in order to determine the contribution of school administrators to the professional development of branch teachers in terms of course controls, no findings were found that school principals contributed to the professional development of branch teachers. According to the results of the research, it is stated that school administrators should always take into consideration the activities that will ensure the professional development of teachers in course supervisions.

According to the results of the research, the majority of the teachers stated that they wanted the inspections to be carried out by the group teachers. In Green and Winter (2015), Başol and Kaya (2009), the majority of teachers want the supervisor to conduct the course inspections. When the teachers asked the supervisor to do the supervision, it is thought that there may be reasons such that the principal and the teacher are in the same environment and that the principal has the opportunity to evaluate the teacher in all aspects. Similarly, in the study conducted by Altun (2014), it is seen that the primary preferences of the participants about who should conduct teacher supervision are school principal, assistant school principal, head of the department and MoNE provincial inspectors. Aslanargun and Göksoy (2013) stated that as a result of their research aiming to determine the opinions of teachers about who should perform teacher supervision, teachers reported opinions in the form of institution manager, self-supervision, all education stakeholders and education supervisors. The main findings of the research are that the school principals know the teachers to be supervised better than the supervisors among the reasons of conducting the supervision, that the teachers know the aspects that need to be developed, that the teachers are aware of all the activities they perform, that the teachers are aware of the activities not only during the lecture hours but also during the extracurricular times (Yılmaz, 2009).

In general, when the opinions of the teachers are considered, it is seen that teachers mostly want to be evaluated with a supervision approach that can guide them, shed light on them during the education process, change them positively by seeing their deficiencies and motivate them. This can be explained by the desire of teachers to be in a comfortable environment during the supervision and evaluation process, to overcome the problems arising from lack of experience with the support of more experienced people and to provide maximum benefit to all stakeholders in the education cycle by developing solid relationships in this process.

Because, as it is understood from the teachers' statements, in the schools where they work, teachers are evaluated with a control-oriented supervision approach or supervision activities are superficial and as a result, they approach the supervision process negatively. As a matter of fact, all the teachers participating in the study think that school principals cannot effectively demonstrate their course supervision roles.

According to the teachers' statements, the evaluation of their courses causes serious discomfort to the teachers and creates stress on them. In this case, teachers may try to be more attentive and try to appear as if they are necessarily doing their job perfectly during the course supervision process. In addition, it may be another reason for the tension that the course inspections are conducted only at certain times of the year and that a positive or negative judgment is made about the teachers within a limited time period. The fact that the school principal is also a colleague and the development of informal relations within the school may have brought to mind "discrimination and injustice". Furthermore, rather than how teachers carry out the lessons or operate the teaching-learning process, the control of whether the necessary documents are prepared only shows that the training is carried out on the basis of documents rather than quality.

This may be due to the fact that the group teachers are in the same field of expertise, the teachers can see their positive and negative aspects more easily and offer realistic solutions, share information, make them feel more comfortable among themselves and operate the communication process between them more positively. In addition, employing more than one evaluator instead of performing the supervision by a single person can both enhance the objectivity of the assessment and help capture missed points.

Suggestions

At this point, by considering the opinions and expectations of the teacher and restructuring the supervision understanding, it should be questioned what the main purpose of the supervision should be, what should be done in the process of achieving this goal, how the supervision process can be operated effectively and who should be assigned for the supervision task. Supervision activities of school principals if done properly, may prevent the consequences,

such as being too result-oriented and generally carrying too much document control. Moreover, they can contribute to the development and training of school personnel. School principals can observe all the activities of teachers and other school personnel to reveal the real situation and correct the deficiencies determined as a result of the supervision as they have the chance to know the environment well. In order for such a situation to be realized, the principals' awareness level should be increased and they should be supported to work selflessly. In addition, if the school principals will continue their course supervision duties in the following periods, arrangements can be made regarding the training of school principals in the fields of supervision and guidance-counseling, workload and supervision duties. However, as it is frequently emphasized in the studies on supervision, it is seen that Turkish Educational System needs philosophical and structural arrangements that will meet the need for supervision.

In this study, only the views of teachers were used and the majority of the teachers wanted to supervise themselves. However, other cases have also identified different conditions. Therefore, the situation can be examined for those who perform the supervision themselves or the working group can be diversified and a qualitative study can be conducted on the reasons for the differences of opinions of the supervisors, administrators and teachers about who should perform the supervision. In addition, data were obtained only through interviews. For the sake of understanding the process of supervision in more detail, different data collection tools, such as observations, document review, etc. can be examined.

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Research Article

Contribution of Project-Based Studies to School Culture According to Principals[1]

Abdullah Balıkçı[2], Elife Kılıç[3]

Abstract

Understanding the actions that affect and form the presence of the organizations is important in understanding the organization itself. The purpose of this research is to determine the place and importance of project-based studies in the formation of school culture from the perspective of principals. Qualitative research method and phenomenological design were conducted in the study. Eleven principals participated in the research. Criterion sampling and convenience sampling among the purposeful sampling strategies were used in order to determine the participants. The data were obtained through the interviews and observations. The data triangulation, comprehensive field survey, external audit, and direct citation strategies were utilized for the validity-reliability aspect of the study. As a result of the research, it was observed that four themes, twelve categories, and twenty-eight sub-categories emerged. Based on the data, it is comprehended that four themes existed. These are: School culture, creation of school culture, project-based studies, and project-school culture relationship. As a result of the research, it is concluded that the school culture and projects are important in providing a suitable environment for educational activities in school and in implementing a certain organization. It is also understood that the project-based studies display a proximodistal characteristic. In addition, it is observed that there are various gains from the projects. Some recommendations are given in the last part of the research.

Keywords: *School culture, project-based studies, principal, qualitative research.*

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[2] Asst.Prof.Dr., İstanbul University-Cerrahpaşa, Hasan Ali Yücel Faculty of Education, Department of Educational Sciences, abdullah.balikci@istanbul.edu.tr, https://orcid.org/0000-0002-9824-0197

[3] Prof.Dr., İstanbul University-Cerrahpaşa, Hasan Ali Yücel Faculty of Education, Department of Educational Sciences, ekilic@istanbul.edu.tr, https://orcid.org/0000-0002-6751-9259

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Okul Müdürlerine Göre Proje Tabanlı Çalışmalarının Okul Kültürüne Katkısı

Öz

Örgütlerin yaşamını etkileyen ve yaşamalarına biçim veren eylemlerin anlaşılması, örgütü anlama noktasında önemlidir. Araştırmanın amacı, okul müdürlerinin perspektifinden okul kültürünün oluşumunda proje tabanlı çalışmaların yerini ve önemini tespit etmektir. Araştırmada nitel araştırma yöntemi ve fenomenolojik desen kullanılmıştır. Araştırmaya on bir okul müdürü katılmıştır. Katılımcılar belirlenirken amaçlı örnekleme stratejilerinden ölçüt örnekleme ve kolay ulaşılabilir durum örneklemesinden yararlanılmıştır. Veriler görüşmeler ve gözlemler yoluyla elde edilmiştir. Araştırmanın geçerlik-güvenirlik aşamasında veri çeşitlemesi, kapsamlı alan çalışması, dış denetim ve doğrudan alıntı stratejilerinden yararlanılmıştır. Araştırma sonucunda dört temanın, on iki kategorinin ve yirmi sekiz alt kategorinin ortaya çıktığı anlaşılmıştır. Araştırmada verilerden hareketle dört temanın ortaya çıktığı anlaşılmaktadır. Bunlar: Okul kültürü, okul kültürü oluşturulması, proje tabanlı çalışmalar ve proje-okul kültürü ilişkisidir. Araştırma sonucunda, okul kültürünün ve projelerin okulda eğitim öğretim faaliyetlerinde uygun bir ortamın sağlanması ve belli bir düzenin hayata geçirilmesi adına önemsendiği anlaşılmaktadır. Proje tabanlı çalışmaların yakından uzağa bir özellik gösterdiği anlaşılmaktadır. Projelerden çeşitli kazanımların olduğu görülmektedir. Araştırmanın son bölümünde önerilere yer verilmiştir.

Anahtar Sözcükler: *Okul kültürü, proje tabanlı çalışmalar, okul müdürü, nitel araştırma*.

Introduction

Understanding the actions that affect and form the presence of the organizations is important in understanding the organization itself. One of the points that should be taken into consideration in understanding the organizations is the culture that exists in the organization. According to Turkish Language Institution (TLI, 2019), culture is a concept that has different meanings such as “knowledge gained by the individual; the form of reasoning, pleasure and criticism skills developed through learning and experiences”. According to Hoy and Miskel (2010, p. 167), it is “shared values and beliefs”.

It is possible to mention about the various dimensions and forms of culture. Organizational culture is also mentioned in the literature as one of them. Organizational culture, according to Hoy and Miskel (2010, p. 165), is “a system of shared orientations that hold units together and give them a distinctive identity”. According to TLI (2019), it is “a set of changeable values, thoughts, and rules that form the behavior of the staff and the general appearance of the place of work, which can be learned and taught through symbols, transferred from generation to generation, and can be changed”. Understanding the contribution of organizational culture in terms of performing its functions in the organization will help to perceive the relationship between organization and culture. According to Şişman (2002), organizational culture can be perceived as an instrument for organizational integration, motivation, productivity, effectiveness, performance, control, coordination, communication, socialization, and problem solving. Therefore, organizational culture can be considered as one of the important factors forming the organizational structure. According to Cameron and Quinn (2017), organizational culture is;

- ✓ It provides organizational administrators with the opportunity to increase their effectiveness thanks to its conceptual and scientific aspects.
- ✓ It gives ideas about how the things work in the organization.
- ✓ It presents a sense of identity.
- ✓ It helps to balance the unwritten and unspoken principles and experiences.

In this context, the organizational culture is;

- ✓ Practical.
- ✓ Effective.
- ✓ Inclusive.

- ✓ Both qualitative and quantitative.
- ✓ Manageable.
- ✓ Valid.

According to Hindle (2014), the behaviors of employees (which are in the form of peer learning), the process of staff selection (employing appropriate staff of organizations to their own culture), the nature of work (the existence of a work-specific culture), and the external environment (the society in which the organization continues to exist). It is observed that what refers to the organizational culture is a strong and healthy culture in the related literature. In the context of organizational culture, the school culture also has its own characteristics. These are:

- ➢ Being goal-oriented,
- ➢ Including codetermination,
- ➢ Being open to innovation,
- ➢ Leadership,
- ➢ Cooperation among the teachers (Engels, Hotton, Devos, Bouckenooghe and Aelterman, 2008; cited by Bayrakcı, 2014)

The school administrator has an important function in the formation of the school culture and its existence in accordance with its purpose. According to McEwan (2018), an effective school administrator should pay attention to certain points in building school culture. These can be listed as:

- The school administrator perceives the importance of culture and values to it.
- The school administrator is aware of what a culture is.
- The school administrator contributes to the development of the core values of culture.
- The school administrator knows those who contribute to the core values of the culture and rewards and appreciates them when appropriate.
- The school administrator cares about the needs and interests of people in terms of culture.
- The school administrator is aware of the huge contribution of small culture-related things to the school.

Whereas Hofstede (1990) defines the role of administrator in organizational culture as to establish a connection between subordinates, Schein (1984) determines this task as to contribute to the survival of culture in keeping with change. Westhuizen, Mosoge, Swanepoel,

and Coetsee (2005) emphasize that the school administrators attach importance to their stakeholders in organizational culture. Stakeholder contribution to the school culture will help the school administrator better manage the school. Deal and Peterson (1990) state that the implementation of the stated mentality by the administrator will contribute to the effective conduct of student-centered studies by the student. Fourie (2018) describes the role of principal in the school as making a learning-teaching centered culture dominant by making the attitudes of teachers towards school positive and improving their performance. Wagner, Harrison and Vogel (2016) emphasize on what the school administrators do for students in terms of positive effect on school culture. These are the studies related to academic achievement of the students and development of learning environments as well as the social activities supporting these studies. Çevik and Köse (2017) mention that there should be a healthy communication and cooperation between the teachers and the principal so as to create a school culture as stated. Similarly, Renchler (1992) states that an understanding of school administration based on open communication and cooperation in school culture will bring success.

Many different studies on the connection between school, school culture, and school administration were found in the literature. Ketterlin-Geller, Baumer, and Lichon (2015) state that the presence of meaningful communication will contribute to school culture. School culture can be transferred to the student through organized and special programs. In order to do this, the school administrator needs to be aware of the necessity of a suitable environment in the school environment and create the environment. The purpose is to realize a culture that can contribute to the education of successful students. A study carried out by Mees (2008) indicates that there is a positive relationship between the attitudes of the principals and student achievement. In his study, Savory (2014) stated that there is an understanding of development in a successful school culture and that the school administrator has an important effect on the creation of culture in the desired direction around the school. Şimşek (2003), on the other hand, suggests that the principals should have communication skills in order to achieve the desired effect in school culture. The research by Kraft, Marinell, and Shen-Wei Yee (2016) shows that the attitude of school administrators towards teachers is decisive for effective school culture, and that the more developed the school culture is, the better the performance of teachers is at school.

Different studies are carried out in schools to create and develop school culture. One of them is projects. Many benefits are expected from long-term projects. According to TLI (2019), the project is a scientific study task that has been previously planned and programmed in different fields, the cost of which has been calculated, approved by the governing bodies of the institutions and organizations, and accepted to be carried out on behalf of the private institution or the government by designing them in terms of the short and long term. As it can be understood from the definition, the project is accepted by the parties in the short or long term and is considered to bring benefits to the project parties. When the related literature is examined, it is understood that the project studies have positive effects. Akıllı (2017) lists these effects as follows: These are to gain work experience, to develop cooperation environment with students and teachers, to help the understanding of the scientific method, and to contribute to looking at the events from a different perspective. It is revealed that the project studies affect the emotions of students and that these emotions are generally positive (joy, enthusiasm, etc.). Kocaarslan (2010) states that the project tasks are beneficial in terms of gaining the habit of working together, sense of responsibility, and problem solving habit among the students. According to Börekci (2018), project-based studies improve the cognitive skills of students. In addition, such studies increase the interaction among students and lead to increased motivation in the classroom. Therefore, it contributes to the further implementation of what is learned and to project-based studies at school. The study by Karakuş (2004) has similar results. According to the research, the project-based approach has a positive effect on the lives of students both in and out of school and especially on their problem solving skills. The projects can have positive effects on such psychological levels of the project team as communication and motivation. Zelyurt (2011) reveals that the project training taken by the teachers for a school culture based on project studies will have a positive effect on project studies. The same research shows that the teachers are eager to receive training on project studies and that the training will facilitate the management of the projects. However, according to Karadeniz (2012), in the project studies to be carried out, the project managers are expected to assist and support the project team, and they are also expected to balance the effects of adverse situations (constraints, resource shortages, etc.).

It can also be stated that there are items in the Turkish Education System that are expected to contribute to the school culture. These are shown in Table 1.

Table 1
*Items related to Project Studies**

Item Number	Legal Basis	Related Item Number
1	Constitution	42
2	Basic Law of National Education	2,11,13,34,35,43
3	Regulation on Preschool Education and Primary Education Institutions of Ministry of National Education	4
4	Regulation on Social Activities in Educational Institutions of Ministry of National Education	7
5	Regulation on Secondary Education Institutions of Ministry of National Education	4,5,7,161

*These were taken on 06.02.2019 from the links below
http://www.meb.gov.tr/mevzuat/liste.php?ara=12, http://www.meb.gov.tr/mevzuat/liste.php?ara=2, http://www.meb.gov.tr/mevzuat/liste.php?ara=6

Initially, CHE (Council of Higher Education) thesis bank was searched for this study. A total of 492 theses (420 for MA and 72 for PhD) have been searched in the field of related education and training. In addition, the researches which are thought to be similar to the research topic have been examined in journals in various indexes related to the research topic. In the theses and journals, it has been observed that the current research has not been sufficiently investigated both in terms of subject and method. Although the researches revealed the construction of the projects, the things carried out through the project and the school culture, the problems encountered, and the thoughts related to them, it was observed that its connection with the school administration and the principals in particular was not examined sufficiently. The quantitative research method was generally preferred as the research method in these studies mentioned above. All these points make the researchers think that the preferred subject and method will contribute to the field.

Purpose of the Research

The purpose of the research is to determine the place and importance of project-based studies in the formation of school culture from the perspective of principals. For this purpose, the following questions were sought:

1. According to the school administrators, what is happening in the formation process of school culture?
2. According to school administrators, how is the school culture-project interaction?

Method

In this section, the studies about the method of the research are explained in detail.

Research Method and Design

The qualitative research method was preferred in this study. As a reason of preference, qualitative research can be stated to allow the participants to express their opinions comprehensively and clearly and thus to make meaning from the mentioned opinions in line with the research, and to exclude the meanings that are not related to the research. In addition, the experience of the researchers as a school administrator and teacher was effective in the choice of method. These justifications are reflected in the views of Creswell (2016) on how to conduct qualitative research. According to the author, what is important in qualitative research is to spend enough time in the field, to reveal the perspective of participants and to be flexible in the research process. Phenomenology was preferred as the research design. The reason for this preference is the willingness of the participants to present their experiences and their explanations based on their experiences, as can be seen from the quotations in the findings. In addition, as the interviews were conducted and analyzed, it was found that the level of contribution to the research was high and that the design was suitable for the research. According to Christensen, Johnson, and Turner (2015), the phenomenological design is based on how the participants experience and make sense of a phenomenon.

Participants

The participants of the research consist of eleven principals who try to create a school culture based on the projects they have carried out, can transfer their experiences and participate voluntarily in the research. Two of the participants were female, and nine of them were male, and they still work in state schools. The eleven principals include two pre-school principals,

four primary school principals, four secondary school principals, and one secondary school principals. The distribution of the participants according to their branches was as follows: four participants as classroom teacher, two participants as preschool teacher, one participant as Turkish language and literature, mathematics teacher, social studies, religious culture and ethics teacher, and physical education teacher. The seniority of the participants ranges from 8 to 32 years, and the seniority of administration varies between 2 and 32 years. The fact that the researchers had school administration and teaching experiences was also effective in determining the participants. The fact that the researchers have the opportunity to meet with principals in formal and informal meetings and interviews and know whether they have made projects or what kind of projects they have done is thought to contribute to both determining the group of participants of the research and analyzing and interpreting the research data. As stated in the research, since the principals who have made projects were included, the criterion sampling from purposeful sampling methods was used. Volunteering was the basis for the determination of the participants. The views of the participants are not presented by using their real names but using code names. The coding is made as P1, P2, or etc. According to Miles and Huberman (2015, p. 28), criterion sampling is "all situations that meet the same criteria and assist in quality assurance". In addition to criterion sampling, convenience sampling was also used since the opinions of principals who were encountered in formal and informal meetings and were invited were utilized. According to Miles and Huberman (2015, p. 28), convenience sampling provides "time, money, and flexibility savings at the expense of information and reliability". Maximum variation sampling was also used in the study since there were participants from different school types. According to Miles and Huberman (2015, p. 28), maximum variation sampling is "to document different varieties and to identify important general patterns". In the study, it was not considered necessary to increase the sample size by considering that the data obtained from eleven principals were sufficient to describe, comment, and draw conclusions. In the literature, there is no mention of a certain number and size for sampling size, and the data are taken into consideration (Patton, 2014; Merriam, 2015a).

Data Collection

The data sources in the research are the interviews and observations. A semi-structured interview form was generated for the interviews. In the preparation of the interview form, the

relevant literature was first reviewed, and then an interview was carried out with two school administrators who were planned to be interviewed and thought to contribute to the research. In addition, the research topic was discussed with two academicians studying in the field of educational management and having conducted qualitative research before. Afterwards, the interview form was piloted with two participants. As a result of the pilot practice, it was presented to the opinion of two academicians, and feedback was provided that the answers would contribute to the research and that no change in the interview form was required. In addition, the interview form was presented to the examination of two Turkish Language and Literature experts in terms of language and expression, and the feedback form was taken as appropriate. After the mentioned stages, interviews were conducted with nine principals. The interviews lasted a total of 360 minutes and 52 seconds, with an average of 33 minutes and 18 seconds for each participant. 13 main questions and 16 probe questions were asked in the interview form. The questions are based on the experiences of the principal and their understanding of school culture perceptions and activities, the projects carried out and the effects of these projects, and finally the school culture-project interaction. 10 of the questions were related to the research topic, and the other 3 questions address the methods, permissions, and situations that are expected to be included in the research. Besides the main questions, the probe questions were also used at the interview. According to Merriam (2015b), the probe questions are directed to explanations aimed at accessing more information. The second source of data is the observations of the researchers. Two points were considered in the observations. The first one is the observations that the researchers have while working as teachers and school administrators. The second one is the observations made by taking the issues mentioned by Merriam (2015c) into consideration. The observations were made before, during, and after the interviews in the schools where the participants worked. The subjects to be observed were transformed into a form based on the source specified by the researcher and used in the research. The opinions of the researchers about the participants, the attitudes towards the participants, the practices carried out for the mentioned opinions, the environment, and the remarkable points that can contribute to the research are included in the form. The data obtained are stated in the findings section.

Data Analysis

The data were recorded by using the voice recorder, and the recordings were documented. After the documentation step, the written form of the interviews were sent to the participants, and then the analysis phase was started after their approval. According to Glesne (2015), data analysis is a study of establishing order and creating a meaningful whole for the research data. Open coding was used in the data analysis. The reflection of the open coding to the research was the re-reading of the transcripts, revealing the relationship between the data, and reaching the category and the latest themes based on the relationships. This coding-based study is shown in Table 2. According to Neuman (2010), open coding is the first coding of qualitative data, and the researcher examines the data and summarizes it in preparatory analytical categories or codes. Descriptive analysis technique was also used to analyze the data. According to Yıldırım and Şimşek (2011), it is essential to include the opinions of the participants in the descriptive analysis. The purpose of giving opinions is to explain the findings regularly by considering the cause and effect relationship into consideration. The implementation of descriptive analysis in the research is to reveal the relationship between the data by means of open coding, to convey the opinions about the research directly, to reveal the meaning of the quotations, and finally to compare the findings with the related literature. Content analysis was performed in the analysis of the data. According to Krippendorff (2004), the important point in content analysis is to derive meanings from the texts according to a certain systematic. In the research, content analysis was tried to be reflected through the themes and categories derived from data (Table 2).

Validity-Reliability Strategies Used in Research

Four of the strategies stated by Christensen, Johnson and Turner (2015) were used in order to increase the reliability-validity of the research. These strategies were used in the research as follows:

Data Triangulation: The data were collected by applying the semi-structured interview form to eleven school principals and through the observations by the researchers. In the findings section, the data are respectively presented through the direct citations, the experiences of the researchers as teacher and school administrator, and the data obtained from the opinions of

Merriam (2015c) related to the observations. Observations were made in the schools where the participants were working and in their rooms during the interview.

Comprehensive Field Survey: The literature was reviewed for research, and it was tried to establish the infrastructure for both scientific dimension and interview forms.

External audit: In all stages of the research process, the required evaluations were conducted with two academicians who have done research in the field with qualitative research method, and thus the data that would not contribute to the research were excluded from the research.

Direct Citation: While evaluating the data, the citations obtained through the transcribed data were used, and it was tried to ensure consistency between the comments on the research and the citations.

Ethics in Research

The interviews were conducted after obtaining the necessary permissions and appointments from the participants in terms of research ethics on an individual and institutional basis. For this purpose, a question requesting permission to publish the research was added to the interview form, and the required approval was obtained from the participants. All these approvals were archived in voice recorder and e-mail setting.

Findings

Findings obtained from interviews and observations are given in this section.

Findings Obtained from the Interviews

It is understood that four themes, twelve categories, and twenty-eight sub-categories emerged as a result of the interviews.

Table 2
Themes and Categories in the Research

1. Theme: Perception of School Culture	Definition of school culture	Order
		Environment
	Differences in creating school culture	Working style
		Conditions
	Characteristics of school culture	Values
		Communication
2. Theme: Creating School Culture	Continuous studies	Communication with parents
		Organizing meetings
		Providing appropriate environment
		Being role model
	Highlights	Being empathetic
		Behaviors of administrators
		Supportive approach
	Attitudes of employees	Positive attitude
		Negative attitude
	Facilitating and difficult factors	Parent
		Habits
3. Theme: Project-Based Studies	Projects	Process
		Content
	Objectives in Projects	Correcting negative behaviors
		The need for project studies
		Active participation in studies
		Gaining values
	Evaluation of Projects	Emotional effect
		Contribution to school culture
4. Theme: Project-School Culture Relationship	Reflections of projects on school culture	Positive reflection
	Resuming gains	Considering as a means of experience
		Considering as a means of development

When Table 2 is examined, it is observed that the categories and sub-categories (four categories and eleven sub-categories) in the second theme are more than the other themes. Here, it can be stated that the opinions expressed by the participants in the second theme were the source of the other themes and that the essence of the studies was the studies mentioned in this theme.

Perception of school culture

This theme consists of data obtained from 2 main questions and 4 probe questions. It is understood that the theme is divided into three categories within itself. These are the definition of school culture, differences in creating school culture and characteristics of school culture.

Definition of school culture

This category also includes two categories. These are order and environment. The participants defined the school culture as the environment to be created for the effective and efficient working in achieving its goals, establishing order, and placing a certain discipline in the institution. In the definitions, it is seen that the values and the way of working are emphasized. The participants also linked the physical environment as well as the relaxed working environment to the school culture. The importance of communication in setting the appropriate environment and maintaining order-discipline has also been demonstrated. Opinions related to the subject can be stated as follows:

P2: School culture is commitment to school.

P5: School culture is the order of the school, the rules of the school, the peace of the school, and etc.

P7: It is the work carried out by the whole team in line with the same ideals.

P9: I think school culture is very important. School culture is the ability to do a job with discipline. School culture is order, authority, and everything.

Differences in creating school culture

This category also includes two categories. These are the working style and conditions. The participants stated that the differences in their schools in creating school culture are based on sharing with stakeholders and increasing the contribution of this to both academic and school. The common point in the differences is the specific studying style and conditions of each school. Opinions related to the subject can be stated as follows:

P1: There is good solidarity among the teachers, and I can see that.

P3: Our most important difference from other schools is to reflect the warm and friendly atmosphere to parents, teachers, and our students.

P6: For example, the relationship among the teachers in the school, the physical structure of the school, and the attitude and behavior of teachers towards parents…

P9: The school culture is settled in our school, and our friends are working in a friendly way. They are attracted to each other. This brings us the success, and the atmosphere of peace in the school is formed.

Characteristics of school culture

This category also includes two categories. These are values and communication. The participants evaluated the contributions to school culture more in relation to the environment. They express this as either turning the negative environment into a positive environment or maintaining the positive environment. They preferred to explain the characteristics of culture from the school environment they live in. These characteristics can be accepted as a combination of physical infrastructure, discipline, communication, and unity-solidarity based on these features in the studies and relationships. In addition, it is seen that being done in cooperation with parents is important in terms of both achieving the aim of education and doing things better and student-centered in unity-togetherness. Opinions related to this subject can be stated as follows:

P2: There must be trust, there must be loyalty to each other.

P3: Unity and solidarity of teachers and administrators, and sharing this with the family.

P6: The first of the characteristics of school culture is the relationship between employees.

P9: When there is a school culture, it is very important for the school culture to act together, to create a common goal, and to be willing for everyone when a project is made.

P11: In the institutions, the school principal cannot do anything alone. I see that the administration, parents, teachers, and students become more conscious in the school. We all have to work together.

Creating school culture

Three main questions and five probes were used in relation to this theme. Four categories were formed based on the data obtained. These categories are continuous studies in creating school culture, highlights in the school culture, the attitudes of employees in school culture, and facilitating and difficult factors in school culture.

Continuous studies

This category includes four categories within itself. These are communication with parents, organizing meetings, providing appropriate environment, and being role-models. Participants emphasize that parents have an important place in school culture, and they consider it important to reflect this to the studies in the school. In the studies with parents, both the contribution to

the school and the works that can contribute to their development are reflected in the opinions. In addition, formal and informal meeting environments in the school draw attention as continuous studies in the context of school culture. Participants see and evaluate the meetings as a tool for both strengthening internal links and consensus. Ensuring the appropriate environment for the inclusion of parents and employees in the school culture is also among the practices that are carried out by the school administrators since the shaping of the environment in the desired direction arouses the opinion that school culture will also be formed in the desired direction. In order to do all this, it is important that school administrators become role-models for their stakeholders because the employees and other environmental elements can be affected by what the school administrators do and develop attitudes towards the school accordingly. The opinions for this subject can be stated as follows:

P1: I give importance to unity.

P2: First, the teacher should meet with friends to get ideas, and that is not imposed. There must be cooperation, as much as possible, each of my teacher friends has a feature, and I try to find it, touch it and then do the job.

P3: Obviously what we do is to invite the parent into the school.

P5: I care about myself, and I try to set an example.

P7: We are trying to bring our national and spiritual values to the forefront. We are trying to bring love, respect, justice, tolerance, and especially the SEDEP Project implemented by our Seljuk Municipality to the forefront.

P8: The indispensable thing was that the school administration had to be a role model. Their behavior has to set an example.

P9: We first started to do something and to increase self-confidence in the teacher. They've got these abilities. We have started to turn the prejudices in school into predictions.

Highlights

This category includes three categories in itself. These are being empathic, behaviors of administrators, and supportive approach. Participants emphasize being empathic, behaviors of administrators, and supportive approach as prominent points in the context of school culture. Empathic approach in creating school culture is considered important by the school administrators because the empathic approach determines the contribution to the school both inside and outside the school. Participation in the decisions of the school administration can directly affect the school environment, the quality of communication, and the commitment to

the school. The behaviors of school administrators supporting this situation are considered important by the participants. Here, the most important point that draws attention in terms of school culture, as understood from the participants' views; is what the school administrator presents in terms of the personal and professional aspects. The opinions of the participants can be stated as follows:

> *P2: Initially, the teacher should meet with friends and get ideas of them, and that is not imposed.*
>
> *P3: We try to do our work in a planned manner within the framework of respect and love.*
>
> *P4: Rules. Both the unique rules of the school and the legal rules set by the legislation are very important. We share the legal rules very clearly with each of our staff and with our stakeholders.*
>
> *P5: The most important issue in school culture is the principal. The principal determines peace, justice, gossip, communication, and cooperation in school. Care must be taken when choosing a principal.*
>
> *P6: Communication among the stakeholders and satisfaction are very important. We are trying to put ourselves in the place of teachers, especially when making a curriculum. Our school has a misunderstood culture due to its environment. We're trying to eliminate this. We're working on the safety for the school.*
>
> *P7: We are trying to bring our national and spiritual values to the forefront.*
>
> *P9: The distribution of tasks is very important in school culture. It is easier for everyone to do a job than a person does every job.*

Attitudes of employees

This category also includes two categories. These are positive and negative attitudes. The participants stated that, under the influence of the school administrator, the employees generally had positive attitudes towards school culture, and thus they observed behaviors towards contributing to the school culture. In general, it is understood from the opinions that the undesired attitudes are also encountered from time to time. In creating a school culture, the participants stated that the teacher is mainly in the center and that a school culture cannot be built without the support of the teacher. The opinions related to the subject can be stated as follows:

> *P3: Every teacher is in dialogue with every parent. The teacher comes to the school and meets with the parents, so the lessons are not interrupted, and there is a family atmosphere in the school. For example, I was very impressed with the fact that a teacher took care of a disabled student until the evening because*

of her hospital work, and that the teacher met with her parents so that the child could go to school.

P10: I believe that the teacher has more role in the formation and development of this culture than the principal. I would like to thank the teacher who contributed to the school culture in the teachers' board and classroom.

P11: The most important thing is that the teacher, the student, and the parents say this is my school. We are trying to highlight the activities that they feel the emotion of commitment to the institution. In addition, we aim to make them individuals with high academic achievement and basic religious and national knowledge.

Factors affecting school culture

This category also includes two categories within itself. These are parents and habits. The participants agree that the environment is both a facilitating and a challenging factor in creating a school culture. Considering the importance of parents and teachers in the context of school culture, the effect of the experiences can be better evaluated. It is understood that the studies to be carried out without the support of the teachers and parents will not contribute to the development of the school and will hinder the open system understanding mentioned in the administration literature. In addition to these factors, the participants emphasized that the existing habits are determinant when they come to the school where they work. Habits, like other factors, can be both facilitating and challenging. It is thought that these habits are one of the points that the school administrators should take into consideration in the formation of school culture. The related opinions can be stated as follows:

P2: The difficulty is always available. There is a habit. Because it is difficult to change the habit, it is actually his or her truth. You have to show him or her the truth itself, so he or she can give up his or her attitude.

P3: My teachers and my staff are the supporters for us.

P5: Some teachers are more supportive. Their support is very important.

P6: Of course there is. For example, there is a school culture, which is not easy to change. Most of our teachers support us in changing this culture, but we also have teachers and parents who do not. These are the problems that we usually encounter.

P7: We have just mentioned about the presence of a team. In that sense, if the team is insufficient, it is a problem.

P11: The wrong habits obtained in other schools, teachers, administrators, parents, or not participating in the teamwork have negative effects.

Project-based studies

Data on this theme were obtained from three main and five probe questions. It is understood that three categories emerged based on the data. These are the projects, the objectives of the projects, and the evaluation of the projects.

Projects

This category also includes two categories within itself. These are processes and content. The participants demonstrate that the project process is both laborious, troublesome and exciting and pleasing. The point that draws attention in the point of projects is that the participants try to carry out the projects closely both in and out of school, inside and outside the region, both in the country and abroad, and try to adopt the mentioned working style as a school culture. Here, it is emphasized that the studies should be carried out with the understanding of teamwork. The opinions of the participants can be stated as follows:

> *P4: In addition to the project-based school academic education, we are trying to create a brain-centered structure, since the social sciences, where human beings are social entities, are also prone to such a project. Therefore, TÜBİTAK and European Union projects are very important for us and we are trying to associate each student with a project. We care about each contest. We try to motivate and raise the awareness of teachers and students and involve them in this work.*
>
> *P5: We have a project called "Become Family with Books" in our school. KPP (Konya Plain Project) supports this. We have "The Cleanest Class" project. In addition, we participate in projects carried out in the district.*
>
> *P10: All the projects of our school are on three stages. The first one is "human first, education first". We want to raise our children as good people, not as knowledge monsters. We act according to "Sensitive Family, Virtuous Child" and "Every Child is Special" approach. In our classrooms, we do reading activity for 15 minutes every day.*

Objectives in the projects

This category includes four categories within itself. These are correcting negative behaviors, the need for project studies, active participation in activities, and gaining values. It is understood that the expectations of the participants from the project studies are high. It is noteworthy that they deal with the projects both in educational and instructional dimensions, as well as covering the lives of students outside the school. It is understood that all these elements make the school a habitable and willing place for all stakeholders, especially students,

and contribute to the image of the school. Some examples related to the opinions of the participants can be stated as follows:

P1: We have seen that if our teachers are willingly attending the meetings, seminars and the projects, the productivity increases there.

P2: In the solution of the problems, a consensus can be provided, and the wrongs can be seen, and the truths can be revealed. As a project, everything is for us, for a livable future…

P5: Reading books is the basis of education. If a person doesn't read or doesn't understand what he reads, we can't tell him any lessons.

P9: We disrupt the education part of children. We want to educate good people in line with the curriculum. We also think that projects can contribute to education. We do it so that they can think freely, develop their self-confidence and develop their imagination.

P10: We think that all of our projects should be in the interest of human, children, and community. We want to keep them alive at school.

P11: Our goal is to raise our children in accordance with national spiritual values, to increase the academic achievement of our children, to ensure that they understand the basic religious values in the best way, to train individuals who fulfill their responsibilities in social life, and to obtain educational gains.

Evaluation of projects

This category also includes two categories within itself. These are emotional effect and contribution to school culture. The participants stressed that the project process was troubled and exciting but that all these experiences turned into happiness at the end of the project. Positive feedback is received from the projects, and the project process is considered as an important step towards strengthening the school culture because it is believed that the projects benefit to the school, students, parents, and teachers. It is understood that the participants attach importance to two points in the project studies. The first one is convincing the team members and thus providing support to the project to be carried out, and the second is that they believe that the projects can achieve their goals through teamwork and try to implement this. The related opinions can be stated as follows:

P1: Preparing projects and taking part in projects is a bit troublesome. A few people take on the tasks, and therefore these people get crushed because of taking over and do not want to participate in the studies to be done later. We made a nice sharing between ourselves, and everyone added something.

P4: It's about loving. If a person loves something, he or she becomes motivated. People like to do what they love. So, we do this with volunteer groups. We are

trying to create the infrastructure for someone to volunteer for this. Sometimes, there are complaints about it. Fr example, I couldn't be in that group. Will a new group be opened?

P5: We start the project with excitement. We are experiencing some difficulties during the project.

P7: For example, when we started SEDEP, some of our friends opposed us. We explained this project to our teachers and parents. Everything happens when they believe.

Project-school culture relationship

Data on this theme were obtained from two main and two probe questions. It is understood that two categories emerged based on the data. These are the reflections of the projects on the school culture and resuming the gains.

Reflections of projects on school culture

This category also includes a category within itself. It is positive reflection. It is understood that the participants agreed that the projects had a positive effect on the school culture. It is reflected in the opinions that the projects contribute to gaining positive behaviors to students, providing unity and solidarity, and increasing commitment to the school and harmony. It is emphasized that the positive reflections will be the pioneer of changes and developments in the desired direction in school culture. Opinions of some participants can be stated as follows:

P1: In each of our projects, we have seen that our students and parents have significantly increased their contribution to the school. We have seen that we will bring our students to school through the projects and activities.

P4: Of course, it further strengthens the culture and increases our ties with each other. We get the opportunity to get to know each other closely. With the motivation and excitement of doing the tasks, the staff is better known. They are better committed to school culture. The main concept here is the commitment. On this occasion, the compliance of the staff is increasing. Ties are getting strengthened. The competition is based on very sweet rivalry.

P5: Negative behaviors decrease.

P6: These projects affect all stakeholders in terms of school culture. The project-based activities led to the formation of team spirit in the school culture, increasing the desire of the students to come to the school, and increasing the trust of the parents to the school.

P7: For example, consider the value of "respect". We did it with the kids. The students do not run out of class. They know they can hurt their friends while

they run. They take care of their speaking to the elders. These are our observations.

Resuming gains

This category also includes two categories in itself. These are considering as a means of experience and considering as a means of development. The participants see what is happening in terms of resuming gains both as an experience -individually and professionally- and development, and they consider it appropriate to continue the enrichment in terms of both quality and quantity. They also care about the spread of what is happening to the environment. The opinions related to the subject can be stated as follows:

P2: We will ensure continuity.
P4: I think our biggest achievement is the students we graduate. We believe that they will progress much better in their social life.
P8: We definitely share our activities with the people around us. We share everything with the county and provincial national education directorate. We invite them, and we tell them what we can do. We are trying to present our sensitivity.
P9: We plan to have a different activity every year. We do not want the education to be interrupted. We continue the projects we started last year. This year, we added new ones.
P10: We want to be an effective school until the student's decision to get married. In doing so, we want to involve our parents in the process. We want the school to be with the family, not just with the child, and we are working on this.
P11: We must continue our work. We will continue to give importance to consultation. We need to change what we believe is not useful. We will struggle to continue the gains.

Data obtained from Observations

The observations, which are based on the teaching and school administration experiences of the researchers and which are expected to be made by paying attention to the situations stated by Merriam (2014), include five points. These are the opinions of the researchers about the participants, the attitudes of the participants towards the research and the researchers, the examples of the participants embodying their opinions, the schools and the principal rooms where the interviews were carried out, and other remarkable points that may contribute to the research.

According to the observations of the researchers, the participants provide various activities and practices in the schools where they work. These activities are both in the study schedule of the school and added by the teachers' board to the study schedule of the school. It is thought that it is decisive for P8 to express his satisfaction by sharing one of his activities with the

participants in the award ceremony. Although there is a different number and quality of activities in each school visited, an activity and project-based school culture is in the effort to be placed in the school. While it is expected that all schools will continue their activities within the framework of the same legislation, the differences in the number and variety of activities in each school are thought to be directly related to the attitude of school principals according to the professional observations of the researchers. However, despite the differences in all schools, it was observed that they were in an effort and search. These observations are considered important by the researchers in terms of showing that the project and activity based approach mentioned in the interviews are being tried to be implemented.

It is thought that meeting with the researchers and meeting them in a hospitable manner, giving clear and sincere answers to the questions are determinant in reaching the purpose of the research. It is thought that this was due to the fact that the researchers and participants were colleagues and personal acquaintances. The positive communication between the researcher and the participant provides a confidence in expressing opinions. Furthermore, the fact that the participants stated that they wanted to be informed about the results of the research and that they did not answer the phone calls during the interview gave a positive communication between the researcher and the participant. These cases indicate that the interviews were conducted in accordance with the purpose of the research.

The participants presented their opinions not only verbally but also through the records they kept on the computer. In addition, the announcements and formal writing examples of various studies and procedures were seen on the boards of the rooms of participants and in the teachers' room. In addition to this, writings and visuals related to the studies carried out were also found in the corridors and in the classrooms. However, whereas the administrative practices and documents (teacher club distribution, list of on-duty teachers, etc.) were observed in the executive rooms and teachers' rooms, the practices and documents related to activities and projects (book reading contest announcement, TÜBİTAK project competition etc.) were available in the corridors and classrooms. In addition, the showcases showing the successes of the activities were found in the corridors and in the principal room. All these indicate that both activity-based and administration-based practices are tried to be completed together and complementary in schools.

It was observed that the schools and administrative rooms were clean and suitable for education and training. The fact that the staff of the school was trying to clean the whole school in two of the schools attended for the interview supports this idea. In addition, the presence of flowers in the administrator room and the teachers' room evoked the opinion that the tasks were done in a comfortable environment.

In general, participants strive to create a project-oriented school culture. The fact that they are willing to explain what they have done in their schools and their efforts willingly, share the activities and the visuals about the gains made as a result of these activities, show the school themselves to the researchers, and explain the situation supports the interview data obtained in the research.

Conclusion, Discussion, and Recommendations

In this qualitative research carried out with eleven principals, the following conclusions have been obtained by the researchers: School culture is taken into consideration to provide a suitable environment for the educational activities and to conduct a certain order. In the school culture, the socio-economic situation of the schools, the attitudes of the parents and the perspectives of the administrators are the determinants of building of values and the spread of healthy communication. Project studies are considered as very important in the schools. It is understood that the project-based studies show a proximodistal character, both in and out of school, in and out of the region, in and out of the country. It is also concluded that there are various gains from the projects. These are to ensure that the desired behaviors are put into practice by keeping the students away from the problems they may experience, to meet the need to provide working discipline and to realize this, and to internalize the values (love, respect, sense of responsibility, etc.) that are tried to be given in the school through the studies that the project team will actively participate in. All projects have an individual and professional contribution to both the school and the project team. The projects have a positive effect on the school culture. The individual reflection of the positive effect is to give the participants an experience with all their processes. In the professional sense, it contributes to the development of the school and the project team since it contributes to the studies carried out in the school and provides a learning environment. In this study, which is generally based

on school culture and in particular on the project-based studies, it was observed that the importance of school culture and the attempt to bring it to life through various activities such as projects are indispensable for the development of both the school and the stakeholders. This observation coincides with the findings carried out by Stanford (2014); Bower and Parsons (2016); and Parwazalam, Syed Kamaruzaman, Aliza, Nor Afizah (2014) about the fact that the school culture will contribute to the employees, as well as the motivation of the contribution to the organization and that all these developments will contribute to the school culture in parallel with this increase in success. The conclusion that the school administrators play an important role in maintaining a healthy existence in terms of creating school culture is also observed in the result of the studies conducted by Küçükali (2011); Melesse and Molla (2018); and Ohlson, Swanson, Adams-Manning, Byrd (2016). According to the researchers, a good education administrator takes the opinions of the teacher into consideration. He or she makes efforts to make the teacher happy at school. The administrator creates a school culture based on development through various studies including academic achievement. The relationship between school culture and school administrator has also been examined by Fitzhenry (2010); and Sabancı, Sönmez, Şahin and Yılmaz (2017). According to the results of the research, the principals have an important role and contribution to school culture. This result is thought to be similar to the conclusion in the current research that the school administrators should be a role model in school culture. It is also thought that the result that the project-based studies provide various benefits to the project team is in line with the research finding in the study carried out by Yılmaz (2017) that the project studies contribute to the problem-solving ability of the students. In addition, the conclusion that the attitudes of school administrators are important in creating a project-based school culture coincides with the research findings obtained in the studies carried out by Yaşar (2015); and Carroll, Fulmer, Sobel, Garrison-Wade, Aragon and Coval (2011) that the support of the school administration is also important for the success of students in their studies.

Based on the research, the followings can be recommended for practitioners: School administrators can focus on project-based studies in building school culture. What is obtained from the projects can be shared with those who are willing to do the project but need guidance on how to do it. The efforts to create a project-based culture can be supported. Project training seminars can be organized for the teams for project-based studies. Project examples can be shared with the institutions that are stakeholders in education. For the researchers, the

followings can be proposed: The current research topic can be developed and explored by including the other stakeholders in the school. The topic of the research can be discussed by using different research methods. Since there is not enough research in the literature regarding the relationship among the school culture, project studies, and principals, some other further research can be done by examining this relationship.

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Research Article

Developing EFL Learners' Speaking and Oral Presentation Skills through Pecha Kucha Presentation Technique

Osman Solmaz[1]

Abstract

The goal of this study is to examine the potential of Pecha Kucha presentation style for English language learners who are prospective teachers of English. The participants were students enrolled in an advanced-level speaking course in the English language teaching department of a state university in Turkey between 2016 and 2018. Students were required to make presentations in Pecha Kucha format, a fast-paced, time-constrained presentation technique. As part of the study, 102 students completed an open-ended survey and a total of 12 students representing cohorts from each year participated in semi-structured focus group interviews. Thematic data analysis illustrated benefits of using the presentation style such as perceived development in speaking, self-confidence, time management and presentation skills, and drawbacks including an increase in anxiety, steep learning curve, and constraints due to the format. In addition, the findings showed that English language teacher candidates recognized the technique's potential and reported a high rate of intention to integrate it into their future language teaching pedagogies. The study is concluded with the discussion of implications for EFL learners, pre-service language teachers, and educators in higher education context.

Keywords: *English as a foreign language, Pecha Kucha, pre-service English language teachers, teaching speaking.*

[1] Dr., Dicle University, Ziya Gökalp Faculty of Education, Department of Foreign Language Education, osolmaz@dicle.edu.tr, https://orcid.org/0000-0003-2983-1177.

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Yabancı Dil Olarak İngilizce Öğrenenlerin Konuşma ve Sözlü Sunum Becerilerini Pecha Kucha Yöntemiyle Geliştirme

Öz

Bu çalışmanın amacı, Pecha Kucha sunum tekniğinin İngilizce öğretmeni olacak İngilizce öğrencileri için potansiyelini araştırmaktır. Çalışmanın katılımcılarını 2016 ile 2018 yılları arasında Türkiyedeki bir devlet üniversitesinin İngilizce Öğretmenliği bölümünde ileri düzey bir konuşma dersi alan öğrenciler oluşturmuştur. Öğrencilerden hızlı tempolu ve zaman sınırlamalı bir sunum tekniği olan Pecha Kucha formatını kullanarak sunum yapmaları istenmiştir. Çalışma kapsamında 102 öğrenci açık uçlu bir anket doldurmuş, farklı yıllarda bu dersi alan öğrencileri temsilen oluşturulan toplam 12 öğrenci ise yarı yapılandırılmış odak grup görüşmesinde yer almıştır. Tematik veri analizi, bu sunum tekniğinin konuşma, özgüven, zaman yönetimi ve sunum becerileri alanlarında pozitif bir gelişime, kaygı düzeyinde artış, zorlu öğrenme süreci ve formatın sınırlılıkları gibi hususlarda ise negatif bir etkiye sahip olduğunu açığa çıkarmıştır. Bunun yanı sıra, bulgular İngilizce öğretmen adaylarının tekniğin potansiyelinin farkına vardıklarını ve tekniği gelecekteki dil öğretim pedagojilerine dâhil etme konusunda yüksek oranda bir niyete sahip olduklarını belirttiklerini göstermiştir. Çalışma, yükseköğretimdeki eğitmenler, yabancı dil öğretmen adayları ve yabancı dil öğrencileri için çıkarımların tartışmasıyla sonuçlandırılmıştır.

Anahtar Sözcükler: *Yabancı dil olarak İngilizce, Pecha Kucha, İngilizce öğretmen adayları, konuşma öğretimi*

Introduction

Oral communication in the target language is among the primary goals of foreign language teaching. Educators in higher education context aim to provide opportunities for learners to reach a sufficient proficiency level in speaking despite being challenged by reasons such as large classes and dense syllabi (Angelini & García-Carbonell, 2019). This is particularly true for English language teaching (ELT) departments, which require EFL teacher candidates to master speaking skills for various reasons, such as communication in general and for future instruction as learners are expected to be equipped with different speaking strategies to use when they become teachers (Widyaningrum, 2016). Courses offered in ELT departments typically require students to make oral presentations as extensive speaking activities, which can create meaningful opportunities for teacher candidates to develop their speaking and presentation skills, actively engage them in the content, and encourage collaborative learning. Given the development of information technologies creating new ways of making presentations, students should be encouraged to deliver their presentations by exploring different technologies which might lead to better oral communication skills compared to traditional presentation tools (Murugaiah, 2016).

Pecha Kucha, "chit chat" in Japanese, is one of the innovative and creative presentation styles (https://www.pechakucha.com/). The technique requires presenters to deliver content in 20 slides, each of which automatically runs for 20 seconds within a program like PowerPoint (PPT). The presentation is quite visual as it emphasizes the use of photos, images, or graphics, while text use is often limited, thus ensuring a quick and clear delivery of content. The technique has been previously adopted in university-level classes as an option to develop learner presentations, minimize the disadvantages of traditional PPT presentations, and create opportunities for self-reliance and autonomy. The results of previous research examining the use of Pecha Kucha (PK) in higher education settings suggest that learners have positive attitudes towards PK use (Mabuan, 2017), while some of them have preferred the technique over traditional PPT presentations (Beyer, Gaze, & Lazicki, 2012). The investigation of PK use in EFL classes illustrated that the technique had positive contributions to learners in several ways including a perceived development in speaking (Colombi, 2017) and fluency (Zharkynbekova, Zhussupova, & Suleimenova, 2017), opportunities for additional language

practice (Hayashi & Holland, 2016), improvement in presentation skills (Nguyen, 2015), and a reduction in public speaking anxiety (Coşkun, 2017). In addition to the identified advantages, PK was criticized due to its fast-paced rigorous nature of format, which sometimes created pressure on learners (Ruiz, 2016). Nevertheless, PK was found to have potential as a creative instructional technology to develop various learner skills in tertiary-level EFL classes. Despite the benefits put forward by previous research, the number of studies specifically examining English language teacher candidates employing the technique as EFL learners and studies conducted in Turkish higher education settings is limited. Guided by the literature in the field, the present study aims to illustrate the perspectives of tertiary-level EFL learners studying at the department of ELT in a Turkish state university. In addition, the study examines teacher candidates' intentions to adopt PK presentation in their future teaching in relation with their PK experiences at university.

The Use of Pecha Kucha in Higher Education Context

The ubiquity of Pecha Kucha (PK) presentation style has increased in higher education classes in recent years, leading researchers to explore the potential of the technique in different undergraduate settings, such as psychology (Beyer, 2011); marketing (Levin & Peterson, 2013) and medicine (Abraham et al., 2018). A growing corpus of research investigating the use of PK presentation in second/foreign language learning and teaching contexts has emerged as well (e.g., Nguyen 2015, Ruiz, 2016). This section is organized in a way to highlight a review of the literature on the examination of PK technique in both general higher education context and specifically second language learning and teaching settings.

Among the earliest works investigating the effectiveness of PK presentation was the study conducted by Klentzin, Paladino, Johnson, and Devine (2010), which employed a post-test experimental design to compare PK with a traditional and longer PowerPoint-supported lecture. Following the participation in a plagiarism-related lecture by librarians either in a PK or a PowerPoint (PPT) format, students completed a test on the delivered content and achieved similarly higher performances. The findings suggested that PK can be employed to present information at a similar quality level yet in a shorter period of time compared to a traditionally longer PPT. Similarly, Beyer (2011) designed a series of studies in which undergraduate students enrolled in psychology courses were required to make a presentation in either PK or

traditional PPT format. Based on instructor's evaluations, the results suggested that the overall quality of PK presentations was higher as compared to PPT presentations. In a similar study, Johnson and Christiansen (2011) compared traditional PPT presentation with a *Simplified-Visually Rich Approach,* which was similar to PK. They reported that college students had significantly higher satisfaction although no difference was found with respect to learning outcomes. In another study, Beyer et al. (2012) compared student interest and information retention from peer PK and PPT presentations by sixty-seven undergraduate students. They found that presentations in PK format were more favored by students although there was no difference in recall of the material. In a similar vein, students enrolled in a marketing course developed an appreciation for the PK format through the semester despite a self-reported apprehension in the beginning (Levin & Peterson, 2013). Finally, medical students in the study of Abraham et al. (2018) had positive perceptions towards the use of PK format citing benefits like organizing content, applying creativity, and presenting concise information.

In addition to the studies above, there are several examinations illustrating the integration of PK presentations into L2 teaching and learning contexts. Due to the origins of the technique, it is perhaps not surprising to see the majority of research being conducted in Asia, such as Singapore (Ruiz, 2016), Malaysia (Murugaiah, 2016), and Philippines (Mabuan, 2017). Among the common themes emerging across the studies were; a) students often displayed positive attitudes towards the implementation of PK as part of language classes (e.g., Colombi, 2017), b) learners reported a perceived increase in their speaking skills (e.g., Nguyen, 2015), and self-confidence (Thomsett & Shaw, 2014), c) PK had the potential to foster English as a Foreign Language (EFL) students' L2 oral presentation skills (e.g., Murugaiah, 2016), d) students reported negative experiences with respect to time limitation and lack of flexibility due to PK format (e.g., Ruiz, 2016). In addition, English as a Second Language students felt that they achieved learning outcomes through an innovative way (Thomsett & Shaw, 2014), while Spanish learners reported a higher level of difficulty for preparing to present in PK format compared to traditional PPT (Ruiz, 2016). Among the other findings reported in the literature were students becoming more autonomous in organizing their ideas and active in learning English (Baskara, 2015), accessing more opportunities to practice language (Hayashi & Holland, 2016; Mabuan, 2017) and learners applying creativity to overcome certain limitations of the technique (Colombi, 2017).

Limited research to date has explored PK's affordances for the students at the department of English Language Teaching (ELT). In one of the studies, Widyaningrum (2016) examined the role of PK in the development of teacher candidates' explaining skill through a quasi-experimental study. The data collected through survey, observation, and comprehension test indicated that PK could positively improve ELT students' performance and comprehension along with explaining skill. It was also reported that PK can be more effective compared to a typical PPT presentation when students are well-prepared. Another study, which was conducted in the context of Turkish higher education, particularly examined the effect of PK on the public speaking anxiety of the EFL learners through a pre- and post-test experiment (Coşkun, 2017). According to the results of the study, English public speaking anxiety of the students were found to be significantly reduced, which suggested that the format could be adopted in EFL classes for specific purposes such as lowering speaking anxiety.

Given that the research featuring English language teacher candidates as participants or Turkey as the context is limited, the present study aims to address the following research questions: 1. What are the benefits of Pecha Kucha presentation technique in tertiary-level EFL speaking classes?; 2) What are the drawbacks of Pecha Kucha presentation technique in tertiary-level EFL speaking classes?; 3) What are prospective English language teachers' intentions regarding the adoption of Pecha Kucha presentation technique in their future teaching pedagogies?

Methodology

Participants

The participants in the study consisted of 102 students from the English language teaching (ELT) department at a state university in Turkey. The students were pursuing a degree to become a teacher of English. The majority of participants were female, which reflected the overall gender distribution at the department (Table 1). The mean age of the participants was 24 in the range of 19 and 44. Participants' proficiency level of English varied between upper-intermediate and advanced, while their self-reported speaking proficiency level differed compared to other skills. 75 participants (73.5%) had never heard of Pecha Kucha (PK)

technique prior to the speaking course they were enrolled in, while 27 students (26.5%) had known about PK beforehand although none of them made presentation in this format.

Table 1

Participants' Demographics

Variables		Number	%
Gender	Female	73	71.6
	Male	29	28.4
Age (years)	19-21	37	36.3
	22-24	40	39.2
	25 and above	25	24.5
Grade	Sophomore	31	30.4
	Junior	27	26.5
	Senior	44	43.1
Perceived level of speaking proficiency compared to other areas	Lower	25	24.5
	Same	47	46.1
	Higher	30	29.4

Pedagogical Instruction and Procedure

Informed by the literature on the use of Pecha Kucha (PK) as a presentation tool in English language classes, the project was designed and implemented as part of a third semester advanced-level speaking course titled *Speaking and Oral Expression Skills*. The instructor, who was the researcher, had previous experience in teaching various skills including speaking in undergraduate English language teaching (ELT) program. The course was designed to create opportunities for students to develop and practice their oral communication skills. Prior to the course, all students had taken reading, writing, speaking, and listening courses for a year at university. Three different cohorts who took the course in the fall semesters of 2016, 2017, and 2018 participated in the study. The first cohort, senior students in the current study, had taken the course in 2016. The second cohort consisting of junior students was enrolled in the course in 2017, while the third cohort students took the course in 2018.

As part of the instruction, students were introduced to Pecha Kucha (PK) presentation technique, a time-constrained fast-paced model to deliver presentations during the first few weeks of the semester. They were provided with examples and explanations for guidance. In an effort to encourage learners to focus more on the content, a PowerPoint template adapted

for PK presentations (i.e., 20 slides, automatic transitions between slides) was shared with students. For the first and second cohorts, all participants were required to choose a topic of their own choice and make a presentation in PK format. Participants' performances were evaluated through a rubric, which was created by the instructor. Mainly adopted from the oral assessment scales of Common European Framework of Reference for Languages (CEFR), the rubric consisted of five main categories, which emphasized the key areas for evaluation: Fluency and Accuracy, Content, Preparation & Time Management, Post-Presentation, and Participation. All of the students knew that 50% of their final grades consisted of their PK performance and participation as also indicated in the course syllabus. For the third cohort, students were required to make two presentations in PK format. They were allowed to choose a topic of their interest for the first presentation, whereas they were required to choose a subject related to English language learning and teaching for the second presentation. A list of optional topics for the second presentation was provided. It was indicated in the course syllabus that first and second presentations had 50% of their mid-term and final exam grades respectively.

Following the topic-related feedback provided by the instructor, all of the students in each cohort performed their presentation during mid-term and finals' weeks in their respective years. As clearly bounded by the format, each presentation took a total of 6 minutes and 40 seconds. In order to encourage students to listen to their partners and create opportunity for the presenter to engage in a post-presentation discussion, the audience was required to ask several questions pertaining to the presentation topic, while the presenter was expected to interact with his/her colleagues. Overall, the presentation including the follow-up section consisted of an approximately 10-minute performance.

Data Collection and Analysis

The sources of data in the study consisted of an open-ended survey and semi-structured focus group interviews. The main goal of administering the survey, formed by the researcher, was to collect demographic information of participants and their comments about multiple aspects of implementing PK presentation in tertiary-level speaking classes. In addition, it was aimed that a larger number of students could be reached. The survey consisted of questions seeking information such as learners' overall experiences with PK, differences in their opinions before and after presenting with PK technique, their future plans pertaining to the use of PK when

they are teachers of English. The open-ended survey was distributed to sophomore, junior, and senior students who previously took the *Speaking and Oral Expression Skills* course through online learning management system. A total of 102 students completed and submitted the online survey. In an effort to document a richer and in-depth account of learner experiences and to complement survey data, semi-structured focus group interviews were carried out. Focus group interview was preferred over individual interviews for the purposes including; a) the possibility of access to a purposive sampling of a specific population, b) potential benefit gained through the dynamic nature of the social interaction occurring between group members (Vaughn, Schumm, & Singagub, 1996), c) alternative interpretation of data collected from open-ended survey through reaching more detailed account of learner experiences. In the online survey, participants were invited to take part in an interview with the researcher. There were a total of 30 volunteers (8 sophomores, 12 juniors, and 10 seniors). Three focus groups consisting of 12 students representing their respective cohorts were formed based on volunteers' availability at the time of interviews. Focus Group 1 consisted of 4 sophomore students (1 female, 3 male), while there were 5 junior students (4 female, 1 male) in Focus Group 2 and 3 senior students (2 female, 1 male) in Focus Group 3. In order to maximize the group synergy and increase student speaking time, participants were placed in their cohorts. This was also required as the questions addressed in each focus group were slightly changed. For instance, an inquiry about the long-term effect of PK presentation on students were only addressed to junior and senior students as it has been more than a year since they presented in PK format. The interviews took place in a quite office space on campus and volunteers were encouraged to reflect on their experiences before, during, and after PK presentations. The recorded interviews were transcribed verbatim following the completion of each interview.

A fine-grained qualitative analysis of the data collected from the open-ended survey and interviews was carried out and both first and second cycle coding methods were applied (Saldaña, 2015). As part of first cycle method, major themes and discourse strands emerging from the data were identified through a descriptive exploratory coding process. This cycle was built upon the initial coding process which started during the collection of data for the purpose of documenting notes for future considerations as the study progressed. Simultaneous data analysis during data collection allows the researcher "to focus and shape the study as it proceeds" (Glesne, 2011, p. 188). For second cycle coding, the data set was reread for the purpose of eliciting codes illustrating ideas, key concepts, and values which are placed under

major themes. In an effort to keep data grounded in participants' own language use, In Vivo coding, referring to the coding based on participants' actual language use, was employed in this cycle as well. The analysis entailed an iterative process, which recognized revisiting of the codes for the purpose of relabeling and refining them as needed. Responses and quotes exemplifying each code were compiled based on the final data analysis. This presented an opportunity to integrate student voices, which are integrated into the section below (e.g., R22 representing survey respondent 22). Following the finalization of each themes and sub-categories, the qualitative data was quantified for two main themes (i.e., benefits and drawbacks) for an exploratory review of the data. It is important to underscore that the researcher was the only coder, which formed one of the limitations of the present study.

Findings

Benefits of Pecha Kucha Presentation Style

The first major theme emerging from survey and semi-structured focus group interviews was about the benefits of Pecha Kucha (PK) presentation technique for English language learners. According to the content analysis of the open-ended survey, several benefits, which are echoed during the interviews, were reported by learners: fluency in speaking, time management, overall speaking, presentation skills, self-confidence and pronunciation (Table 2).

Table 2

Benefits of Pecha Kucha Reported by EFL Learners

Statements	Frequency	Sample learner responses
Fluency in Speaking	42	"After my Pecha Kucha presentation, I started to think that I can be more fluent when I speak."
Time Management	29	"Students become aware of the importance time and they can use their time effectively."
Overall Speaking	27	"It provides students to improve their speaking skills by giving certain information about any topic within a limited time."
Presentation Skills	19	"It improves our effective presentation skills such as getting rid of useless details and focusing."
Self-confidence	14	"This technique increases my level of self-confidence when I speak English"

Pronunciation	9	"Because students are well-prepared, it improves fluency and pronunciation."

A perceived improvement in speaking fluency as a benefit of PK technique was explicitly stated by nearly half of the respondents in the study. Learners viewed the technique as an opportunity which *"offers the students to speak without stopping too much to think or fill the sentences with pauses"* (Interviewee 6). One student cited the time limitation as the reason of the need for fluency by stating *"we give information about a topic in a short time therefore we use language fluently"* (R63). Learners also expressed statements indicating a sense of self-assurance and self-awareness of gaining fluency during and after the presentations (*"I realized that I have fluency in speaking during PK presentation",* R33). In addition to fluency, learners reported that they believed PK could contribute to their speaking in general and public speaking skills in particular. It is perhaps best evidenced in one of the learners' response: *"It is a very good technique for speaking skills and helps students to get over their fears about being watched or being in front of the others"* (R46). Some students opined that PK contributed them through teaching *"how you can speak comfortably in front of audiences"* (R53), and how to *"manage stress while presenting or talking about something in front of the people"* (R40). Overall, learners agreed that PK contributed to the different aspects of their speaking skills, which were also reflected upon by a participant during the focal group interviews:

> *"I think the experience helped me with my speaking skills. It was particularly helpful in terms of achieving fluency in speaking. The technique forced us to speak without fillers in our sentences during the presentation and it is one of the major advantages of the technique." (Interviewee 7, Focus Group 2)*

Development in time management skills was frequently raised by the participants (e.g., *"The most beneficial part of PK for me was that it supported me to improve my time management skills",* Interviewee 11), highlighting the requirement of presenting in a limited time as exemplified in *"You indicate a certain time and you try to finish your planned presentation in this specific time. It provides you to be punctual"* (R97). Also specified was relationship between the need for practice and time limitation, which might play a role in improvement in time management skills.

A recurring theme across student responses was about how PK contributed to the development of their presentation skills. Drawing attention to the specific format of PK, participants positively approached the fact that *"there is not much writing part that controls your speaking"* (R44), which helped them to focus on speaking, visuals on the screen and time management. Other benefits related to presentation strategies reported included getting rid of useless details, increased concentration, focusing on the attention of the audience, stress management, and using images to communicate ideas. One student mentioned some of those strategies during the interview:

> *"We were expected to make presentation in other courses as well. Following the Pecha Kucha experience, I realized that I had learnt to overcome challenges of making good presentations such as keeping eye contact with the audience and time management. I think PK helped me with taking control of my voice, which is soft. I believe I learnt to use it more efficiently because I had to explain my topic in a short time in the most effective way possible." (Interviewee 12, Focus Group 3)*

Another major subtheme was concerned with PK's potential to increase learners' self-confidence. Some students emphasized a positive change in their level of confidence and pointed out that PK "gives confidence to students and encourages learner autonomy" (R77), while others remarked on how completing their presentation made them feel about themselves: "It gives the feeling and excitement of achieving a great job in a short time" (R91), "It made me feel really good because I had doubts about being able to pull it off, but I did it" (Interviewee 8).

In addition to the aforementioned benefits, among the positive aspects of PK were potential improvement in areas including but not limited to pronunciation, vocabulary, reading, and cultural knowledge. Before and during the presentation, students were required to employ different skills for a successful outcome. To illustrate, they were expected to bring together a set of information and convey their ideas clearly, which maximized the importance of pronunciation, reading, and vocabulary, thus leading to an added concentration on these areas as reported by students: *"During preparation and presentation, I learnt a lot of new vocabulary from a broad range of fields and the way these words were pronounced"* (Interviewee 12), and *"Preparation for PK is beneficial since it requires a lot of reading and giving opinions in a systematic order"* (R62).

Drawbacks of Pecha Kucha Presentation Style

A recurring major theme among participants was challenges the learners faced and drawbacks of PK as a presentation technique. Among the challenges posed and critiques made were time constraint, anxiety, steep learning curve, neglecting accuracy in speaking, and memorization (Table 3).

Table 3

Drawbacks of Pecha Kucha reported by EFL learners

Statements	Frequency	Sample learner responses
Time Constraint	38	"I think the time limitation is the major handicap because it can cause students to rush and errors may occur as a result of that."
Anxiety	33	"Anxiety is necessary for learning process but it makes students have high anxiety because of the fast flow of time."
Steep Learning Curve	11	"It is more difficult than traditional presentation because there are no sentences to read, but only images that relate to your topic that you should speak about."
Neglecting Accuracy	10	"Students do not care about their mistakes because they speak fast."
Memorization	6	"Limited time for each slide cause students to memorize all the things."

Compared with the other negative aspects, time constraint was criticized the most. Some students felt frustrated while trying to ensure that their presentations fit into PK technique's format in a specific time frame. They argued that *"sometimes time may not be enough to convey the knowledge"* (R75) or *"students cannot speak exactly what they want to say in a limited time"* (R69), and when they present, they *"pay too much attention to time and it prevents speaking more fluently"* (R79). Constantly focusing on time might have limited learners' flexibility of delivering presentation and conveying the planned content in an accurate way. A response given by one student revealed how time limitation might lead to anxiety throughout the process:

> *"You may be interrupted due to short time, and may not be clear enough to convey your messages to listeners. This short time may force people to be fast. If not speaking on time, there will be chaos in your mind and you feel anxious, uneasy and upset." (Respondent 50, open-ended survey)*

As illustrated above, many students believed that time limit and the anxiety level of learners had positive correlation. Responses received through the open-ended survey featured examples revealing the relationship such as *"Time is limited, so you feel nervous and you may make mistakes while you are speaking"* (R2), *"Time may not be enough and it creates tension on*

people" (R100), *"You have to keep an eye on time and try to remember what you plan to say at the same time which is difficult to balance"* (Interviewee 9). Increasing level of anxiety, however, was also associated with other factors such as lexical knowledge and the audience. For instance, one student mentioned how time limit may inhibit the need to employ a wide variety of vocabulary during presentation: *"You need to use so many different vocabularies and it may be hard when you are under pressure as you may lose self-confidence"* (R7). Another student emphasized the role an audience can play in anxiety students might feel: *"It can create fear but it depends on for whom or the number of the people you would present"* (R23). Anxiety was reiterated as a challenge during semi-structured focal group interviews, in which one student reflected on the issue:

> *"It is true that time limitation creates some tension on students because the presenter tends to think that everything will be lost if something is forgotten during the presentation. The time flows as he tries to remember a word, for example. And then, he moves on the next slide: "How I am going to make connection between them?" If he is not used to it or is not well-prepared and cannot remember a word or make the right connection, he falls head over heels. The stress begins from the moment of thinking about that possibility." (Interviewee 10, Focus Group 3)*

The majority of students did not have previous experience with Pecha Kucha as a presentation technique, the specific format of which was criticized by some learners often due to a lack of familiarity with the technique. Despite a short presentation time, the need for a long period of time for preparation and rehearsal was present among student responses. Some students thought that preparing to present in PK format was harder and took more time than other technology-enhanced presentations. It was sometimes due to the specific guidelines given for the presentation topic *("It may be difficult to choose a suitable topic because the subject should not be too wide or narrow"*, R91), the stress experienced by learners while trying to reach a target content (*"Finding useful information takes more time",* R60), or practicing the content of the presentation (*"We were in search of trying to express the information in the shortest yet meaningful way possible in 20 seconds"*, Interviewee 7). Learners also noted that the format might cause presenters to neglect accuracy during presentations: *"Because of time limit, accuracy is ignored while speaking"* (R14). Furthermore, they mentioned that they did not have enough time to correct themselves. As a result, both meaning in a particular part of presentation or overall quality of content delivery were negatively affected: *"Sometimes finding the exact word can be difficult and while time is passing by, you have to find a way, if*

not, the chain of meaning is deteriorating" (R4). Finally, several students opined that struggling presenters might gravitate towards memorization as a solution for challenges they may experience (*"The stress I had made me memorize some of my sentences so that I could overcome my anxiety",* Interviewee 3).

English Teacher Candidates' Future Intentions to Adopt Pecha Kucha

Given that participants of the study were English language teacher candidates, the study investigated their future intentions to integrate Pecha Kucha (PK) as a presentation technique in their teaching as well. Data analysis indicated that sixty-seven students reported positive intentions to adopt PK when they become teachers of English. Of the remaining participants, thirteen students reported that they did not plan to use the technique, while eight pre-service teachers were unsure and fourteen teacher candidates did not provide any comment on the subject.

Many teacher candidates explicitly stated their intentions to adopt the technique through some changes in the format (e.g., time and number of slides), frequency of making presentation, and the type of assignment for presenting in PK format (N = 22). Majority of the participants planned that they would extend the time for presentations (*"I will give more time for [my students'] presentation as 20 seconds are not enough for each slide",* R1; *"I will prepare the time according to students' level",* Interviewee 12; *"For primary school students, I can keep everything same but have no time constraints for them",* Interviewee 3) and limit the number of slides (*"I can use it for high school students by giving them more time with less slides and let them talk more",* R4). There were students who noted that they would follow the format without any change and one participant summarized her future plans by stating:

> *"I think I will use this technique when I become a teacher. I can adapt the technique according to my students' proficiency levels but I would not change the format. I would let my high school students have the control over their presentations and choose the topics by themselves. They will look at the images and speak as suggested by the format. I will make sure that they feel comfortable while presenting." (Interviewee 11, Focus Group 3)*

Participants' future intentions featured the adoption of PK technique with a change in the frequency of using it. Various opinions were voiced and these included the weekly (*"I would*

like to use it to improve my students' speaking and presentation skills by giving weekly assignments to some of them", R25) and monthly use of PK in their classes (*"I want to use it once a month for the improvement of speaking and listening skills",* R8). Some teacher candidates reported that they would use the technique in their presentations while teaching: *"Every month, I will choose a topic which might interest students and I will present it by using this technique"* (R97). The nature of PK use as an assignment also differed among participants. To illustrate, some students planned that they would give it as a term paper or a performance project, while others intended to use it instead of a written exam. Another student expressed that she would organize a PK competition for her students. Considering the challenging nature of PK's fast-paced and time-constrained format led some teacher candidates to envision that presentations could be delivered as a pair or group work (*"Maybe, instead of an individual work, it can be a group activity and members can present in turn",* R60).

Given that participants are expected to teach English at primary, secondary, or high schools when they graduate, it was not surprising to observe that several teacher candidates (N = 16) possessed a positive perspective towards with an emphasized awareness regarding the technique's appropriateness for their future students' level of English. They opined that they would use the technique depending on their future students' linguistic repertoires (*"If my class is suitable for this technique, I can use it according to their levels",* R70), whether they study at high school or not (*"I can use this at high school, not for young learners",* R67; *"I think it can be difficult for children but if I work at high school, I can use this technique by adjusting time according students' levels and their topics"*, R35), their ages (*"I can ask my adult students to make a PK presentation and talk about their lives, presenting their childhood photos, memories etc.",* R61; *"I think it will be more effective for adults",* R102), their level of English (*"Yes, definitely [I will use], especially when my students are at an advanced level",* R22; *"I can use it for intermediate students"*, R3). One of the interviewees stressed the importance of learning to present in this technique as soon as possible:

> *"I think that it would be better if students become familiar with such techniques starting early ages. We did not know about PK until last year, when we were sophomores. I think that we could have learnt about it earlier. Having a previous experience before university can present learners to have alternatives when they are expected to make presentations." (Interviewee 5, Focus Group 2)*

The analysis of the data showed that several students indicated the underlying reasons for their intentions to adopt PK ($N = 16$). Among the cited motivations were developing future learners' speaking, listening, presentation, and time management skills, which showed that they recognized the potential of the technique. Many students acknowledged potential benefits of PK for their students' speaking and listening skills: *"I can use this technique to help my students to speak comfortably"* (R18), *"There's no doubt that I will use it especially for listening and speaking skills"* (R33). Some teacher candidates concentrated more on PK's potential contributions to their students' presentation and time management abilities: *"I'll use it when I want my students to make an impressive presentation"* (R89), *"I will use it as a speaking activity and to make my students learn how to manage time"* (R29). Among the other reasons shared was developing students' critical thinking, helping them gain self-confidence, and knowing them better (*"I can get to know my students with this activity as I can ask them to make a presentation about their daily life",* R41).

Finally, several students expressed that their future plans did not include the implementation of PK technique or they were not sure about it. They generally agreed that the technique required a high English proficiency, thus making it less suitable for their future learners. Two teacher candidates' reasons of not using the technique were concerned with the level of English they wanted to teach: *"I am thinking of being a teacher in secondary school and this technique is not suitable for secondary school students' cognitive levels"* (R72), *"Actually, I am not going to use this technique in my classes because I will be a teacher for the elementary school students and it will be hard for them."* (R93). Some of the participants were unsure about implementing PK and noted that it depended on the level and needs of their future learners.

Discussion

The present study aimed to investigate EFL learners' perspectives towards the use of Pecha Kucha (PK) presentation technique in tertiary-level speaking classes in Turkish higher education context. The data collected from 102 respondents by means of an open-ended survey and 3 semi-structured focus group interviews suggested that learners viewed PK technique positively and some of them indicated a preference over traditional presentation techniques. This finding ties well with previous research wherein learners displayed positive attitudes

towards PK (Mabuan 2017; Ruiz, 2016) and some students preferred the style versus typical PowerPoint (PPT) presentations (Beyer et al., 2012). Regarding PK's linguistic contributions, the findings of the present study demonstrated that learners had a perceived development in overall speaking, fluency, and pronunciation. A similar conclusion was reached by several studies which highlighted student experiences illustrating PK's contributions to their overall speaking skill (e.g., Angelina, 2019; Colombi, 2017) and fluency (Zharkynbekova et al., 2017). Despite some students noting the fast-paced nature of PK leading to accuracy problems in speech, which was reported in the literature (Baskara, 2015), many learners agreed that PK provided them opportunities to engage in additional language practice such as reading and listening. This is consistent with what was observed in the previous research (e.g., Hayashi & Holland, 2016), in which PK presentations provided a context for students to practice English.

A frequently reported drawback of PK use was associated with the rigorous nature of PK format featuring a constrained time and lack of flexibility. A similar pattern of results was obtained in several studies (e.g., Murugaiah, 2016; Nguyen 2015), which showed that such limitations could be frustrating for learners who have higher speaking anxiety or prefer a slower-paced presentation style. However, the results of the present study also suggested that the strict format of PK enabled learners to improve their time management skills as the technique forced them to use their time efficiently. Listing self-organization among PK's potential contributions to learners, Hayashi and Holland (2016) argued that PK encouraged learners to engage in careful planning and become more conscious about time before and during the presentation as "the time spent on the project's separate elements needs to be carefully managed" (p. 308).

The role of PK in developing students' oral presentation skills was positively acknowledged by the participants. It was also evident from the findings that PK was challenging for some students as it requires learners to spend extra time and effort for preparation, the lack of which might lead to memorization of the presented material. The findings with respect to presentation skills are in accordance with those reported by several studies (e.g., Abraham et al., 2018; Colombi, 2017), in which PK was regarded as an effective way to improve students' presentation skills. Findings pertaining to the time and effort spent for preparation are also consistent with previous research (e.g., Angelina, 2019; Widyaningrum, 2016) with the exception of the study conducted by Beyer (2011) in a context featuring native English speakers. Considering the strict format of PK technique, it is perhaps not surprising as students

need to devote time for content, visual design, and rehearsals, through which they need to achieve brevity for the purpose of delivering content in a timely manner. As also documented in the literature (Murugaiah, 2016), the task of presenting without text on slides in a limited time might cause some learners to memorize the information they present. Nonetheless, it was shown that such a process of preparation ensures the possibility of learners being more involved in the content, thus increasing awareness for self-organization, learning more about the topic, and engaging them in creative thinking (Thomsett & Shaw, 2014).

A further finding concerns the anxiety level of learners, which was reported to have increased due to the PK format. Despite the fact that learners criticized the stress PK caused before and during the presentation, many of them indicated a perceived development in their self-confidence following the PK experience. These results find support from the literature, in which students reported an increase in their level of self-confidence and nervousness being overtaken by the experience (Thomsett & Shaw, 2014), contribution to their confidence to speak English in public (Lucas & Rawlins, 2015), a perceived development in their autonomy (Baskara, 2015), and a significant reduction in their English public speaking anxiety (Coşkun, 2017). Considering students are expected to be well-prepared for their presentations, it is noted that the anxiety they experience before and during the presentation "is regarded as a good motivator that can keep the presenter alert and prevent the speaker from relaxing entirely" (Coşkun, 2017, p. 19). Thus, it may be argued that a potential drawback of the PK technique (i.e., rigorous format) may become its strength when learners manage to be in control of the pressure they might feel.

Finally, the findings suggested that EFL learners, who are going to become teachers of English when they graduate, recognized the potential of the technique for its possible contributions for students and reported a high rate of intention to integrate the technique into their future teaching pedagogies. These results unearth the previously underexplored area of pre-service language teachers' perspectives towards the use of PK as a presentation technique in their classes when they become teachers of English themselves. It is emphasized through the findings that teacher candidates' experiences and their increased awareness as a result of teaching techniques they observe might create new avenues for pre-service teachers to shape their future ideas of teaching. Therefore, it is argued that the employment of presentation techniques such as PK in

teacher education programs might have the potential to contribute professional development of teacher candidates.

Conclusion and Implications

The present study adds to a growing body of research illustrating the potential of Pecha Kucha (PK) presentation style for English language learners from a variety of aspects including improvement in their speaking and other linguistic skills, development of oral presentation and time management skills, and a perceived increase in self-confidence, all of which may be considered as a further validation of the previous studies (e.g., Angelina, 2019; Mabuan, 2017; Ruiz, 2016) from a longitudinal perspective of learners. In addition, the findings of the study arrive at the conclusion that advanced EFL learners, who are studying at the department of English language teaching (ELT) to become teachers of English, display positive preferences with respect to the integration of PK into their future language teaching pedagogies, which might be considered a promising contribution of the present study to the underexplored strand in the literature.

While the current study investigates EFL learners' use of PK in a previously undocumented setting through highlighting the voices of many learners, it is imperative to note that the study is limited to a Turkish state university context and relied on students' self-perceptions. Furthermore, the design of the study fails to encompass students' presentation performances and their achievement of learning outcomes for a more comprehensive examination of the issue. However, the nature of the study, which allowed the inclusion of a high number of students' experiences in PK, and the data being enriched by semi-structured focus group interviews, might increase the generalizability of the research findings by overcoming the limitations imposed. It is suggested that future research examines the comparison of PK style and traditionally longer PowerPoint presentations with respect to learning outcomes and learner performances in second language classes. Due to the potential of PK for language teacher candidates, it is also recommended that researchers investigate PK's roles in the acquisition of content and skills required to become a teacher of English. Finally, it is vital to observe to what extent teacher candidates as EFL learners adopt the technique when they start their teaching career.

The findings of the study have several implications for EFL learners, pre-service English teachers, and educators working in higher education settings. It is recommended that PK can be an efficient instructional technique which should be considered for implementation in tertiary-level EFL classrooms either as a requirement or an option for learner presentations. It could be particularly employed for developing learners' speaking and listening as well as their presentation skills. Considering the format-related challenges faced by students, it is suggested that appropriate modifications in time or the number of slides (i.e., 20 slides for 30 seconds each or 10 slides for 20 seconds each) might be provided for the first presentation of learners if they are expected to present more than once in a single semester. As suggested by Levin and Peterson (2013), learners might present in groups in an effort to familiarize students with the technique. It is crucial for teacher to provide students support by bringing sample PK presentations to the class, assisting learners with the organization of the content they are going to present, providing support particularly to the students who might experience a higher level of public speaking anxiety, and familiarizing themselves with PK presentation style. Finally, considering the potential of PK for language teacher education, the technique could be integrated into pre-service EFL teacher education programs as an alternative to traditional presentation techniques which are used for delivering content (Coşkun, 2017; Widyaningrum, 2016).

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