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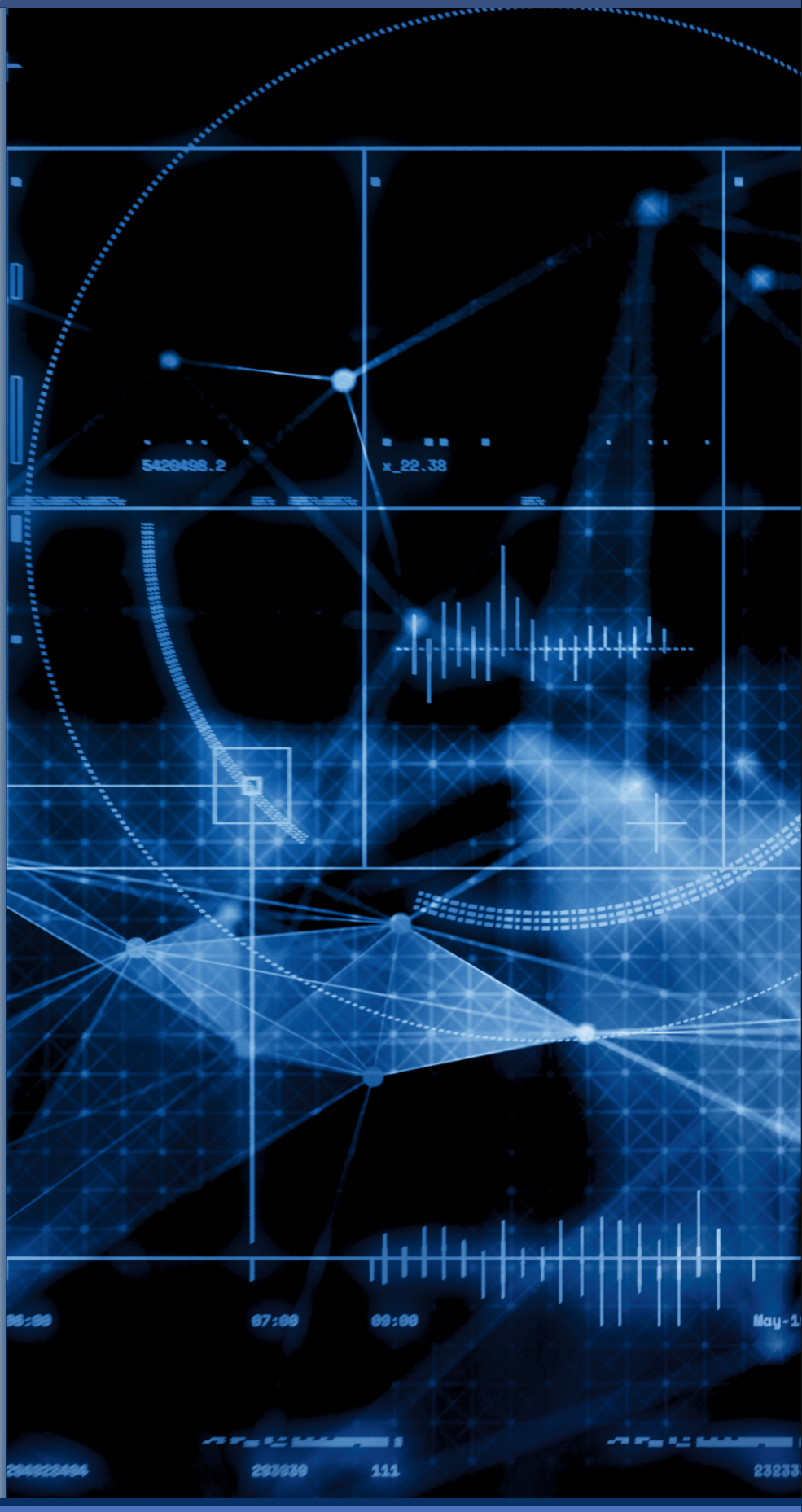

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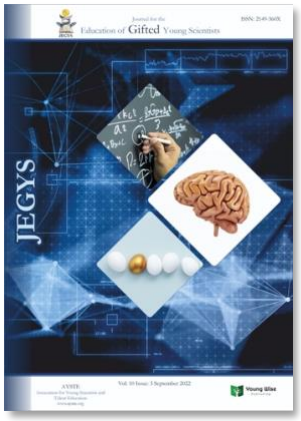

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From the Editor: Is the analysis of the relationship between talent and technology a closed path?

Abstract
It is seen that gifted education programs have become technology-laden. Technology evolves with gifted individuals in many areas. Advances in technology have also become associated with gifted education. However, the news about the relationship between technology and talent causes the definition of technology to be sought outside of human existence as well. In addition, the fact that technology becomes a self-developing entity will put us in a vicious circle. In this issue, you will also have the opportunity to read articles on technology and talent development.
Keywords:
giftedness, talent, technology

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Dear Authors, Readers, Reviewers, Editors
Recently, there have been reports that technological devices can surpass human talent in many areas of talent. The answer to the question is sought by revealing a phenomenon such as the development of technology and the ordinaryization of the talents of talented people (Nugent, 2001; Kaya & Mertol, 2022). This issue aside, developed countries that revise their education programs for the need for gifted engineers also recommend that their students become familiar with technology from a very young age (Periathiruvadi & Rinn, 2012). Now, in the education of the gifted, teachers are required to have high proficiency in the use of technology, and examining teachers' perceptions on technology use is unnecessary research (Zimlich, 2015). Because I also taught science to gifted students, while I was preparing a project report, I could not use Flash Macromedia program in 2009, but an expert who taught them to use this program in 3 lessons was enough for my gifted students. Then I thought, either I'm useless or I'm a software expert. Here I will repeat an idea and word that I have often said.

> *In the future, firstly, normal teachers will no longer take part in gifted education. Students will be in direct contact with mentors in their field of talent. Do not expect advanced STEM education from a classroom teacher or science teacher in elementary or middle school. It neither builds robotics nor software. Then in the near future, engineers will enter the courses of primary and secondary school students. This will appear as a necessity.*

Now, when there are gifted education applications and many technology related articles are submitted to JEGYS, the main discussion comes to our topic.

We know that the relationship between producing and using technology is strong. If there is a human element in the development of technology and if it is developed by gifted people, we can think that technology has a relationship with giftedness and talent. However, if it is necessary to examine this relationship in depth, the relationship may weaken a little if the phenomenon of giftedness and talent is in multiple fields. However, we can say that the relationship between technology and talent has started to increase in different fields.

> *For example, twitter. Why am I giving the example of twitter? Because Elon Musk, who showed the phenomenon of giftedness, wanted to buy Twitter (Isaac, Hirsch & Das, 2022). Why?*

Because using twitter effectively is also related to the leadership feature. The introduction of twitter, which is a simple tool, into the leadership skill seems to have increased the relation of technology. However, we can think that we

are moving towards an intricate point here; When we think that in the development of technology, the human element or the human collective mind will disappear over time, we will encounter a situation like the same thing developing itself. This, on the other hand, can convey humanity to a monotony that has become ordinary in the self-development of something and has a low creative leap, in fact, to a closed-ended path. We refer the detailed discussion of this issue to the scenarios in science fiction movies. In the time we live and for a certain period of time, the role of technology in talent development will be accepted. However, this situation will not last for a long time, and when entering the vicious circle, the human element will make the leap of the talent again.

In this issue, you can find interdisciplinary examples of technology and talent. JEGYS is in its tenth year. It has been one of the most important platforms in the world where academic research is published in the training of gifted young scientists. We would like to thank everyone who played a role in bringing JEGYS to this level. In addition, we invite you to our annual ICGYSE congress.

We are happy to see that in its tenth year, JEGYS is the most followed, read and cited academic journal in talent and advanced science education. We would like to see you among us as author. It is our most important duty to increase the visibility, readability and citedability of your articles. Thanks for your contribution and cooperation.

Best regards

Dr. Hasan Said Tortop
Editor-in-Chief of the JEGYS

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Research Article

Implementing the Japanese Lesson Study as a professional development tool in South Africa

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Abstract

Continuous professional development is an integral part of the professional life of teachers since learning is a life-long activity. Lesson study is a practical approach to promoting teachers' professional development. Lesson study refers to teachers' classroom-based collaborative research to bring teachers together to work collaboratively to plan a lesson. In South Africa, there is a dire need for teachers' professional development due to many challenges in professional development in this country. However, there is very little documented research into the implementation of lesson study in South Africa. This study explored the Japanese Lesson Study to improve teaching quality and to learn in South Africa. The researchers adopted qualitative research with an interpretivist paradigm to explicit participants' experiences of lesson study. A purposive sampling technique was employed to select three participants in a school from Gauteng Province, South Africa. The findings revealed that participants appreciated the workshop and gained knowledge of a good understanding of the lesson study. All the participants acknowledged the awareness of their professional development as a motivating factor for them to continue to plan and work together. The researchers recommended that lesson studies be implemented with teachers from different grades and phases. School leaders should become ambassadors for setting up communities of practice within their schools, districts and provinces. Further studies should be carried out with similar grades in a phase and also in phase planning.

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Introduction

Continuous professional development (CPD) is an integral part of the professional life of teachers. Many teachers in South Africa are desperate for ongoing (PD) since learning is a lifelong activity. The Department of Basic Education

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(DBE, 2011) promotes the creation of professional learning communities (PLC) as a school-based programme and initiative to promote professional teacher development. This is well articulated in the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011–2025 (ISPFTED) (DBE, 2011), which encourages all school principals to become active participants in promoting professional learning communities in their schools. According to Avalos (2011), PD is an essential process that envisages knowledge promotion and growth. The knowledge gained through PD programmes enables teachers to practice it for their learners' benefit. Despite the department's vision of CPD and the establishment of learning communities, there are many challenges to quality PD in South Africa. Many teachers who enter the world of work find themselves unprepared to teach the subjects allocated to them (Deacon, 2016).

Furthermore, according to Green et al. (2011), these newly appointed teachers were not given or exposed to PD training or workshops in South Africa. Deacon (2016) further reported that many newly appointed teachers are often given subjects to teach that were never specialised. To support professional teacher development, the researchers explored various strategies for improving the teaching practice. The researchers identified the Japanese Lesson Study, also known as '*Jugyō Kenkyū*', as a potential approach to enhance teachers' PD in SA. Since lesson study has been effective in Japan and improved the quality of teaching and learning, the researchers agreed on the importance of exploring participants' views and attitudes towards lesson study in South Africa.

Lesson Study as A Professional Development Strategy

What is Lesson Study?

Lesson study is typically defined as teachers' classroom-based collaborative research, which has its history in Japan, starting with Stigler and Hiebert's work which identified best practices from around the globe for improving classroom practice. It is viewed as a shared professional culture with the opportunity and potential to promote and enhance learning, enrich classroom activities and transform the school environment (Arani et al., 2010). Although lesson study as a professional teacher development practice originated in Japan decades ago, this practice is rapidly gaining popularity globally. Although there are many national and international variations of lesson study, the aim is to bring teachers together to work collaboratively to plan a lesson based on a common goal to be achieved. Most lesson studies, according to Groves et al. (2013), consist of the following essential components: the formulation of goals; group formulation of the lesson plan to achieve the goal; presentation of the lesson by one team member while other observe; group discussion and reflection; refinement and strengthening for the next group member to present the lesson. This follows a cyclic process. According to Fujii (2016), the lesson may be drafted before the initial group meeting in the Japanese context. This approach allows for robust and intense discussion of the lesson. Takahashi and McDougal (2016) explain that participants who join a lesson study session usually come to learn something new and novel, not only to refine a lesson. Lesson study is viewed as a highly collaborative model that encourages the development of a community of teachers willing to come together, share ideas, reflect upon their teachings and improve their practice (Stols & Ono, 2016).

Lesson study continues to show promising results for teacher and teaching enhancement (Hiebert & Stigler, 2017) and efficacy for the development of teacher's pedagogical content knowledge (PCK) (Coenders & Verhoef, 2018). Hervas and Medina (2020) state that lesson study consists of a standardised, cyclical process undertaken by a group of teachers. During the lesson study engagement, teachers carry out the following phases or steps:

- Set goals for the research lesson according to the subject, topic, students' knowledge gaps or learning challenges.
- Design the research lesson (instruction, methodology, activities, materials) that teachers will conduct so they can later analyse the research lesson.
- Implement the research lesson while the rest of the group observes and collects data according to the inquiry proposal.
- Reflect collaboratively in a post-lesson discussion.

Hervan and Medina (2020) emphasise that lesson study is a cycle of phases in which the original research lesson is created, deconstructed and reconstructed (reviewed, refined, designed and strengthened) for implementation (see Figure 1).

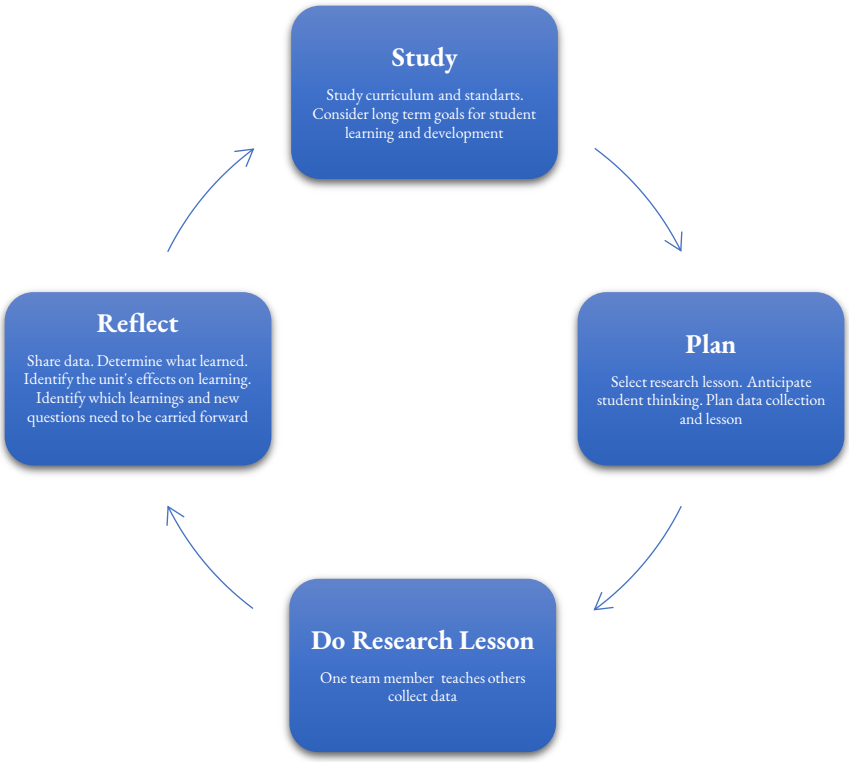

Figure 1. *Lesson Study Cycle adapted from Lewis (2008)*

Importance of Professional Development

Professional development is the term used in education to describe the activities that enhance the knowledge and skills of those in the workforce (Buysse et al., 2009). It involves the development of competence or expertise in a profession and the skills needed to improve performance in that profession (Department of Higher Education and Training [DHET], 2016). Effective PD implies both a change in teacher knowledge and practices and a change in the outcomes of learner learning (Darling-Hammond et al., 2017). Within the context of the proposed research, PD includes the LS activities in which teachers engage that are designed to improve their expertise and overall teaching quality.

"Professional development is the process whereby people's professionalism may be considered to be enhanced, with a degree of permanence that exceeds transitoriness" (Evans, 2014:17). In expounding this stance, PD implies a change in the behavioural (work performance), attitudinal and intellectual (professional-related knowledge) orientation of teachers (Evans, 2014). PD is, therefore, a multi-dimensional and personal process, moving beyond merely changing teachers' outward behaviours to changing their inner mindsets. PD can be characterised as a process whereby teachers learn (knowledge and skills), then learn about learning (pedagogical content knowledge) to transform this knowledge into practice that benefits their learners, ultimately allowing teachers to become better at what they do (Avalos, 2011, DeMonte, 2013; Yoonet al., 2007).

Teachers' PD is addressed in the Department of Basic Education's (DBE) (2015) Action Plan for 2015–2019. The goal of improving professionalism in teaching (goal 16) describes the DBE's vision to strengthen and improve teacher capacity in the country. This goal confirms the DBE's Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011–2025 (ISPFTED) (DBE, 2011). Although it is common practice to plan PD around new teaching practices or ideas, PD should begin with a focus on student outcomes (Guskey, 2014; Patton et al., 2015). Dufour (2004:6) aptly describes the fundamental purpose of education as "not simply to ensure that students are taught but to ensure that they learn". If teachers take the time to investigate what their learners are learning, their PD can be more specifically targeted to improve their lessons and assessments (Stewart, 2014). It has been suggested that teachers use their classroom assessment results as a comparative platform to determine the percentage of learners who

are improving in proficiency and establish learner-centred PD (DuFour, 2004; Guskey, 2014). Brodie (2013) describes how, through the analysis of learner errors, teachers can understand their learners' needs and begin to understand their own needs as teachers by identifying their own conceptual and educational gaps.

Lesson Study and Professional Learning Communities

According to the DBE, the ISPFTED strategy envisions multiple approaches to strengthen the PD of teachers in South Africa. One stream of thought involves establishing professional learning communities (PLCs) in schools (DBE, 2011). The plan acknowledges that realising this goal requires external input by introducing well-trained facilitators. It is believed that these PLCs would allow teachers to integrate their professional knowledge with cutting-edge research and help teachers keep track of development trajectories. Furthermore, PLCs would enable teachers better to understand the use of the curriculum and textbooks.

Although the ISPFTED predicted that "subject-based and issue-based PLCs [will be] widely established" by 2017 (DBE, 2011), there is very little evidence of this at the school level. The time is ripe for LS to come onto the South African stage, as it fulfils all the criteria of a well-tried and reliable method for establishing PLCs within schools and districts. With a growing body of evidence proving that LS is a highly effective and flexible method of teacher development (Cajkler et al., 2014; Dudley, 2013; Lewis et al., 2012; Hunter & Back, 2011), South Africa is lagging in implementing, analysing and documenting this PD tool. LS tempts us with a pragmatic road map for PD, which fits into the larger plan of the DBE (DBE, 2011). However, like with any map, without those brave enough to attempt the journey, the destination will always remain a theoretical possibility and not a proven reality.

Aim and Problem of Study

This paper aimed to explore teachers' experience of lesson study as a PD tool within a South African context. Effective teaching acts on learner success. The DBE has proposed improving teaching practice through the ISPFTED, but there have been some challenges. One such challenge is the poor course quality offered based on the top-down approach, and a second is the lack of know-how to create collaborative learning communities from the bottom up. These challenges set the stage for implementing Japanese LS as a PD tool at the school level. This is still a relatively undocumented and emerging approach in the South African context.

Methods

Research Model

Since the researchers aimed to elicit participants' lived experiences (interpretivism), a qualitative research method of a descriptive nature was adopted for this study. Maree (2020) states that interpretivism is the participants' subjective view, allowing them to discuss their experiences without inhibitions or restrictions. In line with Smith et al. (2009), this approach implies recognising the authentic and unique reading of the valuable experiences that need to be represented. In this context, the descriptive research design, the researchers were able to elicit a detailed account of the participants' lived experiences regarding lesson study, its benefits and challenges in a South African context. According to Yin (2018) and Venketsamy and Hu (2022), case studies offer researchers the opportunity to intensely study a person or a group of people to gain a deeper understanding of the phenomena (lesson study as a PD tool). In this study, the participants were from the Early Childhood Education, a school in Gauteng that accommodates learners from Grades R-2.

Participants

The participants in this study consisted of three (3) teachers, all from Grade 1 class of the same school. The table below presents the three participants in the study. There is evidence that these participants have numerous years of experience, except for one teacher, who was newly appointed at the school. All teachers had their specialisation and qualification in Foundation Phase teaching. All teachers had an NQF 7 qualification, a minimum requirement for teachers in a South African school. All participants in this study were white females teaching in a well-established and resourced school in an upper socioeconomic area in Gauteng. In most Early Childhood Education and Foundation Phase, more female

teachers are employed than males; however, this situation is gradually transforming in South Africa, where male students enter the profession as Foundation Phase teachers.

Table 1. *Structure of Participants*

Participant number	Current grade of teaching	Years of teaching experience	Qualification level	Currently, teaching phase in which she specialised?	Code
1	Grade 1	19	NQF 7	No	T1-G1-F
2	Grade 1	1	NQF 7	Yes	T2-G1-F
3	Grade 1	14	NQF 7	No	T3-G1-F

Data Collection Tools

Data were collected from semi-structured interviews and classroom observations. Before the semi-structured interview, the researchers organised a workshop on lesson study with the participants.

Workshop on Lesson Study

The workshop on lesson study aimed to discuss and provide a background to lesson study. This workshop was conducted on 1 April 2019 for 2 hours with teachers. In this mini-workshop, participants were allowed to discuss lesson study, collaboration and implementation at the classroom level. Once the workshop was completed, the participants were informed to implement their learnings into a classroom situation. Participants were given a month before the interviews were scheduled to elicit their experiences. Interviews took place on 25 May 2019.

Semi-structure Interview Form

The researcher developed the semi-structured interview form, which focused on participants' experience of lesson study within a South African context (Annexure 1). The semi-structured interview form asked questions about the understanding of lesson study, their views of lesson study implementation and how they would like to be supported to use lesson study as a PD tool effectively. Also, one question focused on the challenges of lesson study. To ensure that the questions were appropriate for this study, the researcher followed the guidelines proposed by Maree (2020), that questions should be open-ended to allow participants the opportunity of sharing their lived experiences; use language that the participants can understand; avoid negative or leading questions and keep questions as short as possible. To ensure the validity of the questionnaire, it was presented to two staff members in the Early Childhood Education Department at the University of Pretoria to critique and advise whether the questions were clear, concise and unambiguous. Since there were no severe modifications, the researcher agreed that the instrument was valid and could be implemented.

Data Analysis

To analyse the data and identify appropriate themes and subthemes, the researcher employed Creswell's steps in data analysis. All the data were transcribed and analysed by organising and sectioning responses into units, synthesising them, identifying patterns, and ascertaining which data was essential and needed to be shared (Creswell, 2014).

Ethics

The University of Pretoria granted ethics approval to conduct this study (Ref EC 19/09/01) and the Gauteng Education Department. For ethical purposes, the researchers reached out to each participant with a formal letter of invitation outlining the project and requesting their participation. Participants had to sign the consent form agreeing to participate in the study. They were informed of voluntary participation and were not obligated to remain throughout the study. All three participants consented to participate in the face-to-face interview. They were guaranteed anonymity and confidentiality of their participation. They were informed that during the reporting phase, pseudonyms would be used. The table above presents the codes used in the findings section of the study.

Procedure

The researcher conducted the group workshop and, after that, one group interview of approximately 40 minutes with the three teachers. The group interview allowed participants to share their personal experiences of lesson study in the classrooms. The group interview also made participants aware that the other participants shared the challenges they experienced. Interviews took place in May 2019 at the schools where the staff were employed. All interviews took place after school hours to prevent disrupting class time. The interview with the subject advisor was arranged, and the researcher and the subject advisor met at the school.

Results

Implementing Japanese Lesson Study as a Professional Development Tool in South Africa: Teacher's Experiences

Implementing Japanese lesson study as a PD tool in South Africa was categorised into two broad themes: teacher's knowledge and understanding of lesson study and teacher's experiences in implementing lesson study in their classrooms. In the context of this paper, verbatim quotes are used as evidence in the results, for these allowed for authentic representations of the participants' voices.

This section presents findings that emanated from the participants' responses regarding lesson study in a South African context.

Theme 1: Teacher's Knowledge and Understanding of Lesson Study

The Japanese lesson study (*Jugyō Kenkyū*) is a relatively new concept in South Africa as a tool for professional teacher development. Since most South African teachers are desperate and eager for CPD and the sharing of good practice, the participants in this study indicated they were keen and showed enthusiasm and confidence to participate. During the workshop session, each participant stated;

> T1-G1-F, "*I have been in the system for almost two decades and am always looking for new ways to improve my teaching and learning. I am delighted that I am getting an opportunity of experiencing a different kind of teacher development programme, 'Lesson study'.*"
>
> T2-G1-F, "*I am a first-year teacher, and this training will definitely improve and shape me into a better teacher. I am looking forward to lesson study*."
>
> T3-G1-F, "*I am always eager to attend workshops and training for my own growth and development. This is a good opportunity to learn about a Japanese approach to teaching and learning. We can only improve our teaching in the classroom by learning good practices from other countries*."

From the participants' voices, it is noticeable that there is a high degree of eagerness for growth and development among the participants.

During the workshop session, the researchers asked the participants to share their understanding of the concept of lesson study'. According to T1-GR-F, *"My understanding of lesson study is taking a lesson and studying its different components, that is the planning, time allocation, content to teach and resources."* T1-G1-F stated, *" I think is it about how you teach a lesson to your class, what methods you use in the early grades, for example, group work, whole-class teaching or individual teaching."* T1-G2-F mentioned that *"it is about studying a lesson and improving it each time. Trying something new with the lesson*."

The researchers observed that participants had some understanding of the lesson study and explained to them that their interpretation of 'was acceptable'.

The interviews with the participants took place on 25 May 2019, giving them enough opportunities to work collaboratively and implement lesson study in their class. Post the workshop; there was overwhelming enthusiasm and response regarding their understanding of 'lesson study'. According to T1-G1-F, she stated,

"*Lesson study is about all teachers coming together and planning a lesson. All the teachers own this lesson in the phase for a particular grade.*" T2-G1-F, "*Agreed with T1-G1-F. However, she went on further to indicate that lesson study is about collaboratively working together to improve on a lesson. It is more than just planning a lesson together, and it is about sharing ideas and improving on the ideas.*" In her response, T2-G1-F said, "*How I understand lesson study is more about learning from each other. It is about planning, sharing ideas, teaching, observing and improving the lesson. In the end, we all must develop a final lesson that will be the best.*"

T1-G1-F also added,

"*Lesson study is about developing the best lesson and eventually sharing that lesson with other teachers. To me lesson study is about developing a model lesson which any teacher can take and use in their classroom.*"

The researchers have observed that the participants had a good understanding of the concept lesson study.

Theme 2: Teachers' Experience in Implementing Lesson Study

After the workshop on lesson study with the participants, they were informed that they needed to work together, develop their lesson, and implement it in their classes. The researchers asked the participants to share their experiences of the lesson study. All participants, T1-G1-F, T2-G1-F and T3-G1-F, concurred that the lesson study experience was a positive and enlightening experience for each of them. T3-G1-F said,

The lesson study experience helped me to learn so much from my colleagues. I used to plan my lessons independently and thought they were the best ones. Working with my colleagues, I realised that sharing different ideas about a lesson has helped me improve my teaching and presentation of lessons to my class.

T2-G-F mentioned

Being new to the profession, I have gained much from my two senior teachers. They shared different approaches to teaching a maths lesson. My experience was positive, and I am excited because the final lesson was much better than the one we initially planned. Each time we met, our lesson improved, and we had new ideas and used different resources to teach our lesson.

According to T1-G-F, she said,

My experience of Japanese lesson study is so phenomenal. I am pleased to work collaboratively with other teachers and share ideas and good practices. The lesson study meetings encouraged me to research the latest methodologies to teach maths [since this was the lesson we planned]. I am now looking at how other teachers are approaching lesson studies in their countries, which has given me new insight into teaching and learning.

The response from the participants was encouraging. The researchers probed to enquire the process the participants followed regarding lesson study development, planning, implementation and reflection. The process the participants followed was cyclic. Figure 2 below illustrates the lesson study process followed by the participants.

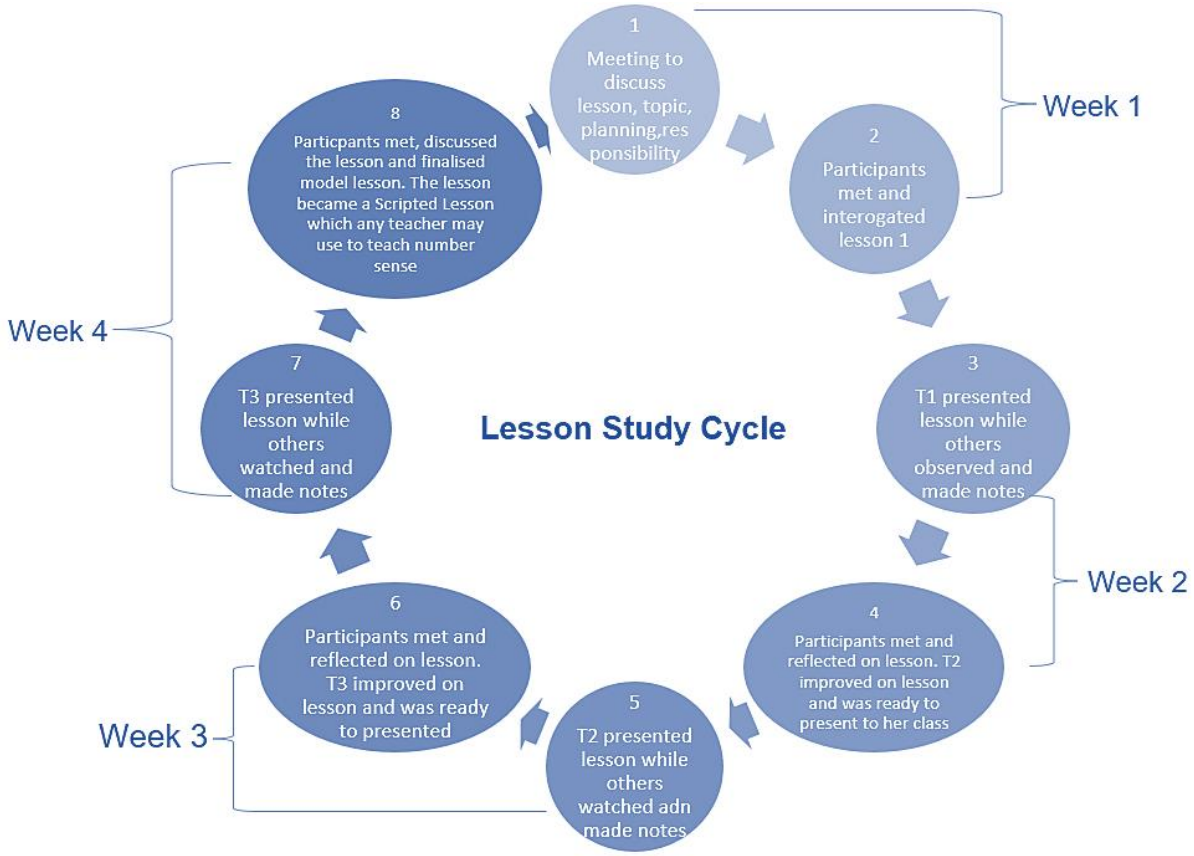

Figure 2. *Lesson Study Cycle*

Step 1: According to the participants, they initially met and discussed the lesson, topic, activities, presentation approach, resources and assessment. They then decided that T1 would prepare the first lesson on number sense and present it for discussion with T2 and T3 in the next meeting.

Step 2: In this meeting, the participants reviewed the lesson, and it was T1's responsibility to present it to her class. The other two participants would observe and make copious notes on the presentation, content, learner involvement, activities, use of resources, and assessment.

Step 3: T1 presented the lesson to her class while participants T2 and T3 observed the lesson.

Step 4: All the participants met and reflected on the lesson presentation. They provided feedback and worked collaboratively to improve the lesson. T2 was responsible for improving the lesson to present to her class.

Step 5: T2 presented the lesson to her class while T1 and T3 observed the lesson.

Step 6: All the participants met and reflected on the lesson presentation by T2. They provided feedback and worked collaboratively to improve the lesson. T3 was responsible for improving the lesson to present to her class.

Step 7: T3 presented the lesson to her class while T1 and T2 observed the lesson.

Step 8: All the participants met and commented on the lesson. Feedback was given and the team worked enthusiastically together and strengthened the lesson. This lesson was finalised and the team agreed that the various inputs and comments from the participants improved the final lesson. The final lesson became a Scripted Lesson Plan for other teachers to use.

Although the lesson cycle was long and took almost a month to finalise, the participants stated;

> *The lesson study cycle was a worthwhile activity, allowing them to observe each other's lessons and interactions in the different classes. Each meeting helped strengthen the lesson and the outcome was a 'polished lesson'.*

To delve into the participant's learning from the lesson study process, the researchers requested the participants to share how they have grown or developed through the lesson study process. The participants indicated that their content knowledge was improved through the lesson study process. T2-G1-F said, "*Through collaboration, reflection and discussion, I realised that my content knowledge of early number sense has increased exponentially*." The interviews showed

several clear examples of how the lesson study process improved content knowledge. The teachers' mathematics vocabulary was enhanced, and they began to understand that mathematics has its language made up of signs and symbols.

Participants also indicated that the lesson study process had impacted their pedagogical content knowledge. All the participants agreed that sharing tips and ideas revealed diverse pedagogical approaches to teaching mathematics among teachers. T1-G1-F stated,

> *While observing both T2-G1-F and T3-G1-F, I have noticed that different educators approach lessons differently. Introducing stories, rhymes, and songs was a brilliant idea to excite the learners for the mathematics lesson. I enjoyed the counting rhymes and bingo [to help learners identify numbers]. This is something I would use in my future lessons.*

The participants, especially teachers who were more than a decade in the system, stated that pre-existing didactic approaches often stifle teachers' teaching and learning. It became apparent that some teachers had a very structured outlook toward teaching mathematics. Their teaching style can be described as more dependent on worksheets and meticulous handwriting, developing fine motor control or emergent literacy. Collaborative planning and reflection allowed participants to reflect on their teaching approaches.

Another phenomenal development among teachers is relying on as minimal textbooks as possible. All participants agreed that a wealth of knowledge, experience and ideas exists within the phase. The lesson study approach allowed participants to 'tap into' each other's knowledge and experience of teaching number sense in the early grades.

The lesson study process opened up the conversation and thinking that reinforced the link between teaching and learner understanding. Participants agreed that each class of learners is different; therefore, lessons should be adapted to accommodate all learners and their different learning styles.

From the participants' quotes, it is encouraging to note that the lesson study has positively impacted all participants. To probe further into their experiences, the researchers asked the participants what some of the challenges they experienced with lesson study were. According to T2-G1-F, she said, *"In the beginning, it was overwhelming and scary for me. I am a newly qualified teacher, and I have to teach a lesson in front of my more experienced colleagues."* T1-G1-F and T3-G1-F both indicated that their challenge was the lesson study cycle. The cycle required all teachers to meet and discuss the lesson at each week's end. They both agreed that time was a significant challenge for them. Despite this challenge, the participants agreed they needed to meet weekly to improve their lesson study.

Figure 2. *Teachers Engaging in LS Planning Source: https://www.sec-ed.co.uk/best-practice/running-your-own-lesson-study/*

Figure 3. *SA Teachers in Japan: LS Reflection Author's own Photo in Japan with Delegates*

Discussion

The findings revealed that participants appreciated the workshop and felt they gained knowledge regarding a good understanding of lesson study. The initial workshop with teachers on lesson study profoundly impacted their knowledge and understanding of the concept of lesson study. According to the DBE (2011), initial meetings and workshops before any programme impact teachers' knowledge and understanding of the phenomena. Participants in this study were able to identify the essential elements of the lesson study process, such as initial meetings, observation of lessons,

collaboration and reflection. In their study, Arani et al. (2010) emphasise the importance of these processes for improving lesson study. They further agreed that lesson study is a collaborative effort by all involved in the process. The participants in this study emphasised the importance of collaboration and reflection. They agreed that both these processes enhanced their knowledge and understanding of teaching number sense content in the early grades.

The participants revealed that despite the lesson study process being long and tedious since they had to meet weekly, they agreed that the cyclic process is integral to lesson study. Helmbold, Venketsamy, and van Heerden (2021) argue for implementing the lesson study cyclic process. She states that this process allows for reflection and improvement of the lesson and aids in refining, strengthening and redesigning the next lesson. The participants concurred with this argument. They also found that the weekly meetings benefit the improvement of the lesson.

According to Spaull (2015), many teachers in South Africa struggle to teach mathematics due to the lack of content and pedagogical content knowledge. Participants in this study agreed that content and pedagogical content knowledge are attained mainly through ongoing PD. The collaborative nature of the lesson study enhanced the participant's content and pedagogical content knowledge, as mentioned by T2-G1-F, who found that she benefitted enormously from her very experienced colleagues. She implemented their various strategies to teach number sense in the early grades. Also, the more experienced participants shared their view that they found the lesson study as an opportunity of deviating away from basic worksheets and textbook-based teaching and learning.

Serrat (2017) states that CoPs are successful only when collaboration, willingness, and eagerness to share are prepared to provide critical feedback. Collegial communities of practice promote the sharing of knowledge, good practice and learning from each other (Darling-Hammond & McLaughlin, 2011). This view is also shared by Wenger-Trayner (2015), indicating that the passion and synergy between people who interact regularly support reflection and growth for continuous PD. This study found that the participants were eager and willing to share their knowledge and expertise. This collaboration, participation and enthusiasm to work together to improve teaching and learning assisted in professionally developing each other. Doig et al. (2011) state that planning a lesson study research lesson is a collaborative and personal process. This process requires in-depth reflection on a lesson's required mathematical content [number sense]. They further articulate that the use of an appropriate pedagogical approach is fundamental.

Another fundamental development the participants attained was the research lesson's teaching and observing. In this study, each participant was allowed to present the lesson to their class. Seleznyov (2018) and Takahashi and McDougal (2016) agree that in a lesson study, it is always essential for one member of the planning team to be encouraged to teach the research lesson to the class while the others are observing (*kenkyu jugyou*). The participants in this study acknowledged that this was a strength of lesson study as a PD tool. Takahashi et al. (2013) agree that lesson teaching and observing offers participants the opportunity to enact and investigate the team's hypothesis about high-quality teaching and learning. T3-G1-F mentioned that it is vital that observers of the lesson study are attentive and focused on the outcomes. This view concurs with Thomson et al. (2015), who stress the importance of teachers remaining highly attentive to the purposes of observation, not merely the processes and documentation around observation.

The influence of lesson study on the PDof early grade teachers profoundly impacted participants. All the participants acknowledged the awareness of their PD as a motivating factor for them to continue to plan and work together. The participants enjoyed the collaboration process with their colleagues. Curiosity was a motivator, with a desire to see the outcome of the process, including the actual presentation of the lesson itself.

Conclusion

LS is a well-established Japanese PD method that has garnered international recognition since the turn of the century. South Africa faces considerable challenges in the PD of its teachers (DBE, 2011), yet recognises the need to "improve the quality of teacher education and development in order to improve the quality of teachers and teaching" (DBE, 2011). There is very little documented research into the implementation of LS in South Africa, even though the method matches the ISPFTED goal of establishing PLCs for PD to be implemented at a school level. Furthermore, there is no documented research into the implementation of LS in the early grades of South Africa and little international

precedence for early grade LS research in general. This study attempts to address the lack of documented research on LS primarily in South Africa through investigating a case study in a local primary school, particularly for the development of mathematics teachers in the early grades.

Recommendations

Although evidence suggests that impressive professional gains were made through lesson study, emanating from the findings and the discussion, the researchers recommend the following:

- Lesson study should be implemented with teachers from different grades and phases. The collaboration across the grades and phases will strengthen teachers' knowledge of the curriculum. Teachers will have an overview of the curriculum across the grades and phases. This knowledge will assist them in planning for sequence and progression,
- School leaders should become ambassadors for setting up communities of practice within their schools, their districts and provinces,
- That communities of practice can develop into network learning communities. These network learning communities can be organised nationally and internationally, where teachers can share good practices. This would further encourage national and international partnerships between schools and countries
- Lesson study should be an ongoing PD tool to support and motivate novice and experienced educators since learning is a life-long activity.

Recommendations for Further Research

The study sample was small and focused on only three Grade 1 teachers in the Foundation Phase. Therefore, further studies should be carried out with similar grades and in phase planning. The authors envisage that findings will be more effective in developing scripted lessons for more subjects in the Foundation Phase. Lesson study across the phase will strengthen teachers' understanding and expectations for the sequence and progression of the lesson.

Limitations of Study

This study was limited to only one school in one district within the Gauteng Province in South Africa. The participants in this study were only Grade 1 teacher. The authors believe this study should be emulated in other grades and phases in more districts and schools to yield similar or dissimilar findings.

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Annexure 1. *Semi-structured Interview Form*

UNIVERSITEIT VAN PRETORIA UNIVERSITY OF PRETORIA YUNIBESITHI YA PRETORIA Faculty of Education
Semi-structured Interview Form
Gender: Male ( ) Female ( ) Age : ...
Interview Questions
Q1. What is your understanding of lesson study?
Q2. Did you hear of the Japanese term *Jugyō Kenkyū*'.
Q3. Please explain your understanding of collaborative teaching and learning.
Q4. What is your experience of lesson study implementation?
Q5. Please share good practices that you benefitted from lesson study workshops held together.
Q6. What is your views regarding other teachers observing your lessons?
Q7. Please share your experiences regarding post lesson planning.
Q8. What were some of the challenges of lesson study you had experienced?

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Research Article

Ethical values of teachers: Differentiation according to regular physical activity

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Abstract

This study, it was aimed to determine the predisposition levels of teachers and pre-service teachers to ethical values. The sample of the study consisted of 1305 educators, 784 teachers, and 521 pre-service teachers in 15 different branches in the 2021-2022 academic year. The sample of the research conducted in the relational survey model was selected by a simple random sampling method. In the research, the Inclination to Ethical Values Scale developed by Kaya (2015) was used as a data collection tool. The scale has three dimensions: Love, justice, and cooperation. In the analysis of the data, mean, standard deviation, frequency, percentage, Mann-Whitney U test, and Kruskal Wallis test were used and .05 significance level was taken into account in the interpretation of the data. According to the research findings, teachers and pre-service teachers got very high scores on the scale. While there was no difference in gender for the level of susceptibility to ethical values; significant results were founded-determined in favor of teachers in terms of status; in favor of physical education teachers in-branch comparison; in favor of those with more than 16 years of service according to professional seniority and in favor of those who do regular physical activity. As a result of the research; it has been seen that teachers and pre-service teachers are very inclined to ethical values and they internalize the value of love the most. Planning functional pre-service and in-service training for pre-service teachers who have not yet started the profession or for teachers who are newly started to the profession. In-depth research is recommended to examine why teachers who engage in regular physical activity have a high ethical orientation.

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Introduction

Ethics is a branch of philosophy that examines the behavior of individuals based on rules, scientifically explains the responsibility of complying with morals and norms, serves systematic moral values, and questions the values of the cultural structure (Akın and Özdaşlı, 2014; Kaya, 2015; Uğurlu and Sert, 2020), and is a field of study of at least 2500

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years, rooted in the Greek philosophers Plato and Aristotle. Aristotle is the first philosopher to define ethics as a field of philosophy on its own by evaluating it separately from theoretical philosophy (logic, physics, mathematics), that is, from positive sciences (Kaya Erten et al., 2017). The word ethics is derived from the Greek word "ethos". Ethics is used together with the meanings of "custom, character, habit, tradition, custom human behavior, morality" (Aktaş, 2014; Baumlin and Meyer, 2018; Kırca et al., 2020; Pieper, 1999; Sadykova et al., 2021). The Turkish Language Association (TLA) (2022) defined the word ethics as "the set of behaviors that the parties must comply with or avoid among various professional codes", "the science of morality, ethics, and morals". Ethics refers to the behaviors that individuals should comply with or stay away from (Büyükyılmaz and Alper Ay, 2017). Badiou (2004) explains the concept of ethics as "a matter of how subjective action and its representable intentions relate to a universal law". Saylan (2010) expressed ethics as "the sum of values that indicate what individuals should do and what they should not do" (Özdemir, 2015). Ethics consists of moral criteria that individuals use to judge their behavior and the behavior of others (Özdemir Çetinkaya and Hatipoğlu, 2019). These moral criteria play a role in determination of the right behavior by directing the behavior of the person (Or et al., 2021). Kuçuradi (2003) on the other hand, the concept of ethics; is defined as "explaining how to react to unpredictable situations that we encounter in daily life" (Uğurlu and Sert, 2020). Ethics investigates moral concepts such as values, norms, rules, right-wrong, good-bad, duties, and obligations that form the basis of people's individual and social relations (Kızıl et al., 2015; Robbins and DeCenzo, 2007; Taş and Bulut, 2020).

Ethics, which systematizes moral behaviors and regulates them in a legal structure, has a controlling feature for societies (Kaya, 2015). Ethical judgments direct human behavior according to the answers to the questions of what is right and wrong, what is done well, what kind of life is good, and what is desirable or not, to understand the desired life (Burakgazi et al., 2020; Çiçek, 2017; Strike and Soltis, 2015; Stone, 2018). While guiding the behavior of the individual, ethics creates new principles and rules (Özkeskin, 2013). Ethics essentially examines the reasons for all behaviors and actions of individuals (Kızıl et al., 2015). The behavior of the individual to be examined must be conscious and moral. There is an ethical examination of individuals who are free in their behavior (Akın et al., 2018). Ethics questions the ethical situation that makes an action a morally good action. It examines concepts such as homework, obligation, and good. On the other hand, it explores the values, norms, and rules that form the basis of individual, social, and business life (Üzüm and Özkurt Sivrikaya, 2018). Ethics increases the quality of public services and provides a strong sense of responsibility (Rençber et al., 2021). Ethics; is divided into three classes: descriptive ethics, philosophy of ethics, and applied ethics. Descriptive ethics explores the existing beliefs, customs, traditions, principles, and practices of people and cultures. Ethical philosophy tries to understand ethical concepts such as good-bad, and tolerance and to verify ethical principles and theories. Applied ethics, on the other hand, focuses on moral issues such as extramarital affairs, capital punishment, and civil disobedience (Akın and Özdaşlı, 2014).

Classification of Ethics and Ethical Approaches

Ethical approaches aim to increase ethical awareness and develop ethical analytical skills (Saunders et al., 2022). Ethics can be studied with teleological, deontological, utilitarian, and virtue approaches in the literature. The teleological approach is aimed at measuring the degree of conformity to the consequences of behavior with moral rules. The correct one is the results that provide the best output (Baumane-Vitolina et al., 2016; Sadykova et al., 2021; Svensson and Wood, 2011). The goodness or badness of the results of an action makes it right or wrong (Özateş, 2010). If the result is good, the behavior is considered correct. If the result is bad, the behavior is accepted as wrong or immoral behavior (Özkeskin, 2013). According to the utilitarian approach, for an action to be morally right, the total benefit of the action must be greater than the total benefit of another action by the individual. According to this understanding, an individual who has to choose one of two different options should choose the one that will provide more benefits (Özateş, 2010). The deontological approach argues that regardless of the consequences of an action, its essential value and the goodwill behind it are the main criteria for choosing it correctly (Kim and Kim, 2017; Sadykova et al., 2021). The deontological understanding of ethics, which cares about the purpose and principle behind the action, rather than the results of the actions, asserts that as an intelligent and responsible being, there are some duties that human beings have to fulfill and

that duty is the basis of ethics (Cevizci, 2008). If the action stems from the desire to do what is good, it is believed to be moral (Özkeskin, 2013). Virtue ethics was shaped primarily by the ancient philosophers Plato and Aristotle. In Plato's understanding of ethics, our moral actions are to achieve the highest good, namely happiness. Realization of good in one person, virtue; the realization of the good in community life is the state. A person who wants to take an ethical action should not only do the right thing but also act with the right thinking (Özateş, 2010). With a moral way of thinking, individuals will be able to achieve happiness. Making use of ethical approaches while making professional evaluations will allow for more accurate evaluations.

Ethics and Morality Relationship

Although the concepts of ethics and morality are sometimes used interchangeably in the literature, the two concepts are considered separately from each other. There is no doubt that these two concepts are related to each other (Sarıgül and Kana, 2018). The word morality, derived from the word "morality" in English and "moralis" in Latin, means "good manners and tradition". The factor that determines the morality of behavior includes unwritten standards, which include acting by the standards accepted by the individual and society over time. Morality is within the philosophical field of study of the concept of ethics (Kayabaşı, 2018; Sadykova et al., 2021). Although the concept of morality is a historically lived phenomenon, ethics is a philosophical discipline that focuses on this phenomenon (Çelebi and Akbağ, 2012). While morality is a social system that draws the framework of individual behaviors, ethics is an abstract activity that examines individual behaviors and is based on thought (Toprakçı et al., 2010). Knowing the cultural values and moral background of the individual allows a better understanding of ethics (Burakgazi et al., 2020). Because the moral understanding and rules of individuals differ as they depend on many values such as culture, ethnicity, morals, and time. For example, in modern societies, education brings pluralistic values to the fore, while leaving the values accepted by the society to the preferences of the individual (Çelebi and Akbağ, 2012). Depending on the preferences of the individual, they have a say in their moral identity. There is a positive relationship between moral identity and moral behavior (Hertz and Krettenauer, 2016; Jino and Mathew, 2021; Xu and Ma, 2016). Ethics is the occupation for an orderly understanding of personal and social moral experiences. It is a search that tries to reveal what is right and what is wrong. With this search, the deficiencies in society are tried to be eliminated. Because every society has an effort to create a social order (Sarıgül and Kana, 2018). Ultimately, ethics emerge from the common point where different moral understandings intersect and form universal norms (Özkeskin, 2013).

Ethics and Value Relationship

The concept of ethics is also related to the concept of value. Ethics; gives us a wide range of values and ideals. We value ethics and try to understand and use them in daily life (Berkeley and Ludlow, 2008). Güngör (1978) explained the concept of value as "the belief that something is desirable or undesirable" (Güngör, 2018: 180). Value essentially expresses the "good" in a moral sense. Although the basic concepts related to human attitudes and behaviors are ethics, the concept of "value" is often used in association with these concepts (Özkeskin, 2013; Yıldız and Dilmaç, 2013). Schwartz (1994) explained values as principles that direct people's lives, are rules, differ in importance, and guide conscious behaviors (Schwartz and Sagie, 2000). Values guide social attitudes and behaviors (Saunders et al., 2022). Values create a belief that life is important and serve as a rating of how important one's activities are (Abiogu et al., 2022).

Ethical Value Concept and Ethical Codes

The concept of ethical value, on the other hand, is a general concept that expresses how individuals should behave in the face of events and facts and explains which behaviors are correct (Özdemir, 2015), and is a set of rules that govern an individual's virtuous behavior, actions, and character. These are important for determination of our behavior. In general, ethical values become a very important tool for the individual by expressing what is right (Ali, 2020; Puyo, 2021). The International Organization of Supreme Audit Institutions has accepted principles such as honesty, independence, impartiality, avoidance of conflict of interest, keeping professional secrets, professional competence, and being open to professional development as basic ethical values (Kayıkçı and Uygur, 2012). According to another classification, love, truth, peace, right behavior, and non-violence are considered 5 basic universal human values (Dilmaç, 2002: 8).

Hamilton and Smith (2016) ethical principles; integrity, honesty, truth, transparency, respect for others, trust, accountability, justice, democratic governance and ethical education, quality education, personal and system improvement, international cooperation, and institutional autonomy examined with article 14 (Elmojahed, 2021). In terms of the individual, it is seen that there are 5 ethical structures: The current situation of the person and the evaluation results, equality, contracting, utilitarianism, relativism, and egoism (Gertsen, 2022). Ethical practices are demonstrated best through values such as honesty, responsibility, dignity, compassion, and justice. Basic ethical values such as love, respect, justice, and cooperation can be taught to students in schools (Okanda et al., 2021; Temel, 2022).

Professional Ethics and Ethical Codes

Based on the concepts of ethics, value, and morality, it can be concluded that ethics are the rules created about the profession by a certain professional group. These universal rules have restrictive sanctions. It regulates the intra-professional competition and wants the professional principles to survive by preserving service standards (Kayabaşı, 2018; Kızıl et al., 2015). In the literature, the concept of ethics refers to the norms that professionals related to a profession must comply with. It is intended to be referred to as professional ethics. One of the most important aspects of professional ethics is that individuals working in the same profession are required to act by these codes of conduct (Bulut et al., 2021; Burakgazi et al., 2020). Professional ethics requires being respectful to nature and people in all relationships, acting based on the element of right, defending the right in the face of injustice, and exhibiting behaviors such as honesty and keeping one's word (Özkeskin, 2013). Professional ethics standards are determined by ethical codes and are of great importance in providing professional ethics. When institutions recruit new personnel to perform the profession, they include the condition of complying with these standards in their contracts. Ethical codes help managers and supervisors make ethical decisions (Çiçek, 2017; Kayıkçı and Uygur, 2012). Different ethical codes can be created for various professions. Behaving kindly, respectfully, and tolerantly towards other people, doing the best while performing his duties, being transparent and accountable in the work done, not taking advantage of his duty for his interests, seeing the public interest above his interests, remaining impartial and fair in every situation, being fair towards himself and others. Being honest, empathizing with those who have been wronged, avoiding extravagance and waste, not harming public goods as well as preventing others from harming others can create general ethical values and principles that can be specified for all professions (Fuertes, 2021; Rençber et al., 2021; Taşpınar et al., 2015).

Ethics of the Teaching Profession

For a qualified education, teachers are expected to be well educated in fields such as field knowledge, teaching profession knowledge, and general cultural knowledge, as well as to have ethical values related to their profession (Sakar and Aybek, 2015; Toprakçı et al., 2010). Ethics is an important issue integrated with the teaching profession and is an integral part of the profession (Or et al., 2021). Teachers have various responsibilities as an element of authority over students. Therefore, he/she should make ethical decisions while using his/her authority and responsibility (Ward, 2020). Professional ethics acts as a guide for teachers to protect themselves and other stakeholders around them in ethical dilemmas gives teachers the responsibility of helping students make the desired changes in their behavior and facilitates teachers to approach their students with more commitment (Burakgazi et al., 2020). Teachers and the teaching profession internationally designated codes of ethics; professionalism, service, responsibility, fairness, equality, honesty, integrity, trust, fairness, respect, love, and professional commitment are listed in the form of professional development (Bradley et al., 2020; Kaya, 2015). Turkey Ministry of National Education (MNE) (2015) on the other hand, the principles of teaching professional ethics; “professional competence”, “providing a healthy and safe education environment”, “observing the lesson and working hours”, “prohibition of receiving gifts and providing benefits”, “prohibition of providing personal benefits”, “prohibition of giving private lessons”, “requesting donations and aids” determined professional ethical principles such as “prohibition of presence”. When the titles are examined, behaviors that are generally forbidden to teachers are listed.

When the ethical codes that teachers must comply with in Nigeria are examined; teachers should dress modestly, live within their means and avoid financial difficulties, attend school and classes on time, not use their students in personal

affairs, not engage in bribery and corruption, should not engage in inappropriate relations with students, should not share exam questions with anyone beforehand, and should not consume any alcoholic beverages during school hours (Abiogu et al., 2022). Similar codes apply to countries such as the United Kingdom (Fuertes, 2021), Finland (Benjamin et al., 2021), and Libya (Elmojahed, 2021). In Turkey, by the "Regulation on Principles of Ethical Behavior for Public Officials and Application Procedures and Principles" published in the Official Gazette dated 13.04.2005 and numbered 25785, 18 ethical behavior principles that public personnel must comply with have been determined. These are: "Awareness of public service in the performance of duty", "Awareness of service to the public", "Compliance with service standards", "Commitment to purpose and mission", "Honesty and impartiality", "Dignity and trust", "Courtesy and respect", "Notification to authorities", "Avoiding conflicts of interest", "Not using duties and powers for benefit", "Prohibition of receiving gifts and benefits", "Use of public goods and resources", "Avoid extravagance", "Binding disclosures and false statements", "Information, transparency and participation", "Managers accountability", "Relations with former public officials", "They are responsible for declaring property" (Public Officials Ethics Board, 2005). In Turkey, when the candidacy process is completed and the transition to teaching is primarily done, trainers sign the "Public Servants Ethics Agreement" and undertake to abide by the ethical rules determined by the Ministry of National Education (Public Officials Ethics Board, 2022). Thus, it promises to comply with ethical standards. Teachers who are public officials accept that they will act ethically with the commitment they have signed, and that the sustainability of the behavior will be according to the reward and punishment system (Çiçek, 2017; Durmuş, 2017). Teachers are aware that they will be punished when they behave unethically.

Ethics Education

A person who can produce ethical value can acquire this ability by learning through experience, not innately. Therefore, the process of learning, internalizing, and transforming ethical values into behavior is the main problem of education and educational institutions (Kaya, 2015). Ethics education is the whole of the activities carried out to make individuals understand that the decisions they will take in behavioral and professional fields have an ethical dimension, to understand the ethical problems that will arise professionally, and to gain skills in solving them (Akın and Özdaşlı, 2014). Ethics education is examined in two categories. First of all, pre-service training programs in which students gain the knowledge and skills of a profession as well as the ethical values of that profession; secondly, it is done with in-service training programs in which the ethical values of the profession they perform in the business life they work in (Çelebi and Akbağ, 2012; Rizzo and Bajovic, 2016). Before the service, pre-service teachers work on getting to know different cultures to be able to provide ethics education (Orchard, 2021). As a result of this training, the society expects schools to deal with those who are culturally sensitive, support tolerance and social cohesion, deal with those who are exposed to immigration, a global problem, and help those with inclusive education and learning deficiencies (McLaughlin and Wood, 2021; Saloviita, 2015; Saunders et al., 2022). The most basic element of ethics education is the teacher, and the main goal of the teachers is to train the students they teach according to the ethical rules. Thus, the teacher is to give direction to society through the students who will grow up in the long term. The civilization level of the society with a high education level is also high. As it can be understood from the definition, teachers are role models for their students when they teach ethical values (Altunay Şam et al., 2016; Bulut et al., 2021; Dawson and Napper, 2020; Jino and Mathew, 2021; Karayaman, 2020). Clearly stating the ethical principles to be followed in schools and complying with ethical principles by all stakeholders of the school increase the quality of the school (Benjamin et al., 2021; Elmojahed, 2021). The ethical leadership of teachers affects students' moral identity and academic citizenship behaviors and brings them to the desired level (Arain et al., 2016; Durmuş, 2017). The curriculum with which the teacher is affiliated determines the ethical leadership framework (Puyo, 2021). In this direction, to be able to provide ethical value education, the MNE (2018) updated its curriculum and switched to a more systematic education approach.

Ethics in the Field of Physical Education and Sport Education

Physical education and sports teaching is a branch of teaching that requires professional and field knowledge and general knowledge and has gained the competence to apply physical education and sports curriculum. The physical education teacher is responsible for carrying out sports activities inside and outside the school. In this respect, unlike other branch teachers, besides teaching, they have duties such as coaching, organizing sports organizations, and preparing the school team for sports competitions. Physical education teachers who carry out these duties act by professional ethics (Kalenskyi et al., 2021; O'Neil and Richards, 2018; Shapran et al., 2022). An inclusive education is planned by bringing in students with various skills or with disabilities through physical education and sports lessons (Rojo-Ramos et al., 2022). Sports education model (Ediş and Gündüz, 2019; Temel, 2022), personal-social responsibility model (Manzano-Sánchez et al., 2021), and traditional games (Bozkurt, 2017; Temel, 2022) are very effective in gaining ethical values to students. Students participating in sports activities learn ethical values, which include behaviors that are accepted by society and that must be followed. For example, in a match, they learn to be respectful against the wrong decision of the referee, to hug each other when their teams score a goal, to share the joy, to cooperate as a team to win the match, and to be fair (Aslan and Karafil, 2022; Öztürk Karataş and Karataş, 2021).

Ethical Studies in the Field of Education

Today, with globalization, political, economic, rapid advances in technology, social, cultural and etc. the developments in the fields have caused a series of changes and transformations in the public sector as well as in all sectors. However, developments in the field of technology have led to changes in the size, quality, and amount of unethical behaviors. These changes have led to unethical behaviors in the public (Sarıgül and Kana, 2018; Taş, 2018). Public officials often have exhibited unethical behaviors such as bribery and abuse of office from businesses or individuals who need services or the protection of government agencies (Ugwuozor, 2020). Although ethics education is a prerequisite for many professions around the world, teacher ethics education has been given less importance or often neglected altogether (Abiogu et al., 2022; Burakgazi et al., 2020). With the realization of this situation in England, ethics courses were added to the teacher training fields of universities (Walters et al., 2018). It has been a pleasing development that HEI has increased the number of business ethics and professional ethics courses in universities to prevent unethical behaviors in Turkey (Özbek et al., 2013). Inexperienced teachers, who are new to the profession, are deeply concerned about being able to control their classroom behaviors. They have difficulty in displaying ethical behavior in crises (Stoughton, 2007). Mahony (2009) argues that the ethical understanding of teachers who practice their profession is not sufficient. On the other hand, Oghuvbu (2007), found that teachers who carry out educational practices in Nigeria are absent from school and classes, participate in incorrect exam practices, demand wages for unapproved work, sexual harassment, and establish close relationships with school principals, etc. it has exhibited unethical behaviors by violating situations to the detriment of students. In the study of Şahan (2018), unethical behaviors such as teachers' inadequacy in classroom management, teaching methods that are not suitable for student level, and rude treatment of students are observed. When teachers encounter irregularities and unethical behaviors related to their profession, they have abstained from reporting the situation to higher authorities because of the fear of getting into trouble (Toprakçı et al., 2010). Teachers, on the one hand, accept that they are faced with problems involving ordinary issues, rules, and requirements in teaching, on the other hand, they accept that they are faced with the uncontrollability and relativity or uncertainty of events (Gertsen, 2022). Teachers can struggle with these uncertainties with their critical thinking attitudes and perceived professional ethical principles (Sakar and Aybek, 2015).

Aim of Study

From this point of view, the research was carried out to determine the predisposition of pre-service teachers who will start the profession and the teachers who practice the profession to ethical values. By determining the ethical levels of the participants, it was aimed to determine the teachers' ability to cope with the problems. Compared to other studies in the literature, the results of this study are important since teachers and pre-service teachers are evaluated together.

Method

Research Model

In this study, the relational survey model, was used. The relational survey model is an economical and useful model that determines the nature of the covariance among many variables and is used for detecting relationships in large sample groups (Can, 2019: 9; Karasar, 2017: 114).

Sampling

The population of the research consists of teachers working in the schools of the Turkish Ministry of National Education and pre-service teachers studying in the 4th grade of the teacher training departments of the universities. The sample of the research consists of 1305 teacher, 784 of whom participated in the study, and 521 pre-service teachers. According to Comrey (1992), a research sample of over 1000 is considered the perfect sample group (Tavşancıl, 2018: 51). In this respect, it can be said that the sample size of the research is perfect. Demographic characteristics of teachers and pre-service teachers are presented in Table 1 in detail.

Table 1. *Demographic Characteristics of the Participants*

Variable	Sub Categories	f	%	Total
Gender	*Male*	640	49,0	1305
	Woman	665	51,0	
Status	*Teacher*	784	60,1	
	Pre-service teachers	521	39,9	
Teacher branches	*Physical education and sports*	483	37,0	
	Primary school teacher	93	7,1	
	Philosophy group teacher	32	2,5	
	Turkish / Turkish literature	98	7,5	
	Science / Physics / Chemistry / Biology	85	6,5	
	English / German	87	6,7	
	Religion	45	3,4	
	Maths	99	7,6	
	Social Studies / History / Geography	68	5,2	
	Pre-school	49	2,4	
	Visual arts	31	2,5	
	Music	32	2,5	
	Informatics	33	2,5	
	Special education	32	2,5	
	Guidance	38	2,9	
Professional seniority	*Pre-service teacher*	521	39,9	
	Less than 5 years	129	9,9	
	6 – 10 years	162	12,4	
	11 – 15 years	119	9,1	
	16 years and above	374	28,7	
Regular physical activity status	*Yes*	597	45,7	
	No	708	54,3	

Data Collection Tools

In research, A demographic information form and a predisposition to ethical values scale were used.

The Scale of the Inclination to Ethical Values

The scale of the inclination to ethical values developed by Kaya (2015) consists of 16 items. The scale, which consists of positive statements, includes sub-dimensions of love, justice, and cooperation. The lowest score that can be obtained from the scale over total scores is 16, and the highest score is 80. When the averages are used, the lowest score is 1 and the highest score is 5. Scores above 4.20 over the arithmetic mean are considered very well, and high scores on the scale indicate that teachers and pre-service teachers are prone to ethical values. The Cronbach alpha internal consistency coefficients of the original scale were .88 for the love sub-dimension, .85 for the justice sub-dimension, .73 for the cooperation sub-dimension, and .90 for the overall scale. As a result of the eigenvalues of the factors, the variance explained that the scale is 61.93%. Scale factor loads range from .829 to .530. Cronbach alpha reliability analyzes for this

research; .74 for the love dimension, .85 for the justice dimension, .71 for the cooperation dimension, and .86 for the overall scale.

Procedure

The study was initiated after receiving an ethical report from Niğde Ömer Halisdemir University Scientific Research and Publication Ethics Committee (dated 05/07/2021 and numbered E-86837521-050.99-79800). Because schools could not provide face-to-face education during the Covid-19 pandemic process, data were collected electronically.

Data Analysis

The obtained data were loaded into the statistical package program (SPSS 24.0) and the conformity of the data to the normal distribution was analyzed with the Kolmogorov-Smirnov test (Büyüköztürk, 2007: 42) and it was concluded that the data ($p<.05$) did not show a normal distribution. For this reason, the Mann-Whitney U test was used in pairwise comparisons, and the Kruskal Wallis test was used in the comparison of more than two groups. The data were expressed as mean, standard deviation, frequency, and percentages, and the error level was taken as .05.

Results

In the study conducted with teachers and pre-service teachers, their tendencies towards ethical values were examined first. Then, difference tests were performed for independent variables that could affect the ethical value tendency. As independent variables in the study; gender, status, teaching branch, years of service, and physical activity status were examined.

Ethical Value Level of Participants

Table 2. *Ethical Values Inclination Scores of Teachers and Pre-service Teachers*

Dimensions	Min	Max	n	x̄	sd
Love	1,00	5,00	1305	4,69	,362
Justice	1,00	5,00	1305	4,65	,496
Cooperation	1,00	5,00	1305	4,35	,670
The whole the scale	1,00	5,00	1305	4,62	,379

Table 2 shows the scores of teachers and pre-service teachers regarding ethical values. It is seen that teachers and pre-service teachers are in a very good condition in all sub-dimensions and overall scale.

Gender and Ethical Value

Table 3. *Comparison of the Inclination of Teachers and Pre-service Teachers to Ethical Values by Gender*

Dimensions	Gender	n	Rank average	Rank total	U	P
Love	Male	640	653,38	418162,00	212558,00	,971
	Woman	665	652,64	434003,00		
Justice	Male	640	644,11	412227,50	207107,50	,364
	Woman	665	661,56	439937,50		
Cooperation	Male	640	636,22	407179,00	202059,00	,105
	Woman	665	669,15	444986,00		
The whole the scale	Male	640	641,33	410452,50	205332,50	,271
	Woman	665	664,23	441712,50		

When Table 3 is examined; No significant gender difference was found in the general and all sub-dimensions of the scale of inclination to ethical values of teachers and pre-service teachers.

Teacher versus Pre-service Teacher and Ethical Value

It is expected that there will be no difference in the ethical tendencies of teachers who are practicing their profession and those who will just start their profession. It is important for the teachers who will build society to be attentive to ethical values to create a beautiful world. They are young teachers of tomorrow who will raise the youth of the future. In Table 4, the ethical perceptions of pre-service teachers regarding the problems they encountered before starting their profession and the problems teachers encountered in their profession were examined.

Table 4. *Comparison of the Inclination of Teachers and Pre-service Teachers to Ethical Values by Status*

Dimensions	Status	n	Rank average	Rank total	U	P
Love	Teacher	784	709,21	556019,00	160165,00	,000*
	Pre-service teachers	521	568,42	296146,00		
Justice	Teacher	784	657,33	515345,50	200838,50	,581
	Pre-service teachers	521	646,49	336819,50		
Cooperation	Teacher	784	661,06	518272,50	197911,50	,331
	Pre-service teachers	521	640,87	333892,50		
The whole the scale	Teacher	784	684,03	536277,50	179906,50	,000*
	Pre-service teachers	521	606,31	315887,50		

*(p<.05)

When Table 4 is examined, no significant difference was found in the dimensions of justice and cooperation. A significant difference was found in favor of teachers in the dimension of love and overall scale (p<.05).

Branches and Ethical Value

Unlike other branch teachers, physical education and sports teachers spend more time with their students for physical activity. Ethical perceptions of physical education and sports teachers, who also participate in sports competitions, can be affected by referee, athlete, and spectator factors. How do these particulars affect physical education and sports teachers compared to other branch teachers? Table 5 tries to explain this situation.

Table 5. *Comparison of the Inclination of Teachers and Pre-service Teachers to Ethical Values by Branch*

Dimensions	Branch	n	Rank average	Rank total	U	P
Love	Physical education and sports	483	669,49	323364,00	190548,00	,218
	Other	822	643,31	528801,00		
Justice	Physical education and sports	483	695,16	335760,00	178152,00	,001*
	Other	822	628,23	516405,00		
Cooperation	Physical education and sports	483	684,34	330534,50	183377,50	,018*
	Other	822	634,59	521630,50		
The whole the scale	Physical education and sports	483	689,93	333236,50	180675,50	,006*
	Other	822	631,30	518928,50		

*(p<.05)

When Table 5 is examined, no significant difference was found in the dimension of love according to the branch. There was a significant difference in favor of justice and cooperation, and physical education and sports branches in general (p<.05).

Seniority and Ethical Value

An answer has been sought to the question of how spending many years in the profession affects ethical perception.

Table 6. *Comparison of the Inclination of Teachers and Pre-service Teachers to Ethical Values According to Professional Seniority*

Dimensions	Seniority	n	Rank average	x2	P
Love	Pre-service teachers	521	578,56	53,372	,000*
	1 – 5 years	129	594,29		
	6 – 10 years	162	676,69		
	11 – 15 years	119	700,87		
	16 years and above	374	751,46		
Justice	Pre-service teachers	521	637,59	23,970	,000*
	1 – 5 years	129	600,63		
	6 – 10 years	162	604,86		
	11 – 15 years	119	618,89		
	16 years and above	374	724,23		
Cooperation	Pre-service teachers	521	641,11	13,397	,009*
	1 – 5 years	129	576,79		
	6 – 10 years	162	628,91		

	11 – 15 years	119	670,23		
	16 years and above	374	700,80		
The whole the scale	Pre-service teachers	521	607,95	39,416	,000*
	1 – 5 years	129	574,09		
	6 – 10 years	162	628,40		
	11 – 15 years	119	661,22		
	16 years and above	374	751,01		

*(p<.05)

When Table 6 is examined, a significant difference was found in the scale and all sub-dimensions according to the professional seniority of the teachers and pre-service teachers (p<.05). In the dimension of love, the scores of those who have 16 years or more of professional experience are significantly higher than the candidate teachers and teachers with 1-5 years of professional experience. The scores of novice teachers are significantly lower than those of teachers with 11-15 years of experience and 16 years or more. In the cooperation dimension, the scores of teachers with 16 years or more experience are significantly higher than those with 1-5 years of experience. The scores of teachers with 16 years or more experience in the justice dimension and the general scale are significantly higher than novice teachers, teachers with 1-5 years and 6-10 years of experience.

Doing Physical Activity and Ethical Value

Teachers appeal not only to students but also to society. In the eyes of society, the teacher should act in accordance with ethical values. Teachers, who naturally communicate with their environment during physical activity, are expected to act in accordance with ethical values. In Table 7, teachers' ethical value tendencies are compared in detail according to their participation in physical activity.

Table 7. *Comparison of the Inclination of Teachers and Pre-service Teachers to Ethical Values According to their Regular Physical Activity*

Dimensions	Physical activity	n	Rank average	Rank total	U	P
Love	Yes	597	665,79	397474,00	203705,00	,252
	No	708	642,22	454691,00		
Justice	Yes	584	673,52	402091,50	199087,50	,050
	No	673	635,70	450073,50		
Cooperation	Yes	584	702,00	419095,50	182083,50	,000*
	No	673	611,68	433069,50		
The whole the scale	Yes	584	688,84	411234,50	189944,50	,002*
	No	673	622,78	440930,50		

*(p<.05)

No significant difference was found in the sub-dimension of love and justice according to regular physical activity. In the cooperation sub-dimension and the overall scale, the scores of those who do physical activity regularly are significantly higher than those who do not do physical activity (p<.05).

Discussion and Conclusion

As a result of the study conducted to examine the ethical inclination of teachers and pre-service teachers, it was found that the participants were prone to ethical values at a very good level. While the highest mean score was seen in the sub-dimension of love, the lowest mean score was seen in the sub-dimension of cooperation. In general, it has been seen that teachers who are preparing for the teaching profession or who are already practicing this profession are inclined to ethical values. In the study conducted by Sarıgül and Kana (2018) on Turkish teachers, it was determined that teachers' predisposition to ethical values is at a very good level. Examining the ethical behaviors of preschool teachers, Sakin (2007) found that teachers adopt professional ethical behaviors and have positive attitudes towards the teaching profession. Kayıkçı and Uygur (2012) determined that teachers primarily evaluate the ethical dimensions of justice, tolerance, respect, and responsibility and drew attention to the observance of these issues under teacher supervision. In general, while teachers are sensitive about exhibiting ethical behaviors, they have argued that ethical behavior is a requirement of

the profession (Çelebi and Akbağ, 2012; Pelit and Güçer, 2006). What motivates teachers to be moral and focus on ethics in their teaching practices is a virtue, which expresses compassion, honesty, and commitment to justice (Campbell, 2013; Yıldız and Dilmaç, 2013). The commitment of individuals with these virtues to professional ethical values is also at the desired level (McHan et al., 2022). Teachers who adhere to ethical values assume the role of a leader through the eyes of their students. Teachers' ethical leadership creates an environment that motivates students to school by influencing students' academic citizenship behaviors towards school. Teachers fulfill their leadership roles by instilling basic ethical values in their students (Arain et al., 2016; Okanda et al., 2021; Vukelić and Rončević, 2021). Students who are instilled with ethical values have some personal characteristics that they want to see from their teachers (Uğurlu, 2008). In this direction, high school students participating in Berges-Puyó's (2018) study, have the personal characteristics they want to see in their teachers; have a sense of humor, be respectful and attentive, be kind, patient, and fair by developing good relations in the classroom. Similarly, the students who received pedagogical formation education, which constitute the study group of Karataş et al., (2019); do not discriminate, do not compare, act fairly and impartially, adhere to professional principles, and do their job sincerely, which is a model with their behavior, "attend to his clothes, appearance, and speech", communicate well, try to improve themselves in their fields, do not impose their ideas and respect different ideas, find teachers who act according to regulations ethical. Teachers abide by the principles expressed by the students by the majority. In the study of Toprakçı et al., (2010), the ethical behaviors of the teachers working in primary schools were at a good level; the behavior of "notifying the higher authorities when irregularities are encountered" was observed as a medium-level ethical behavior. It has been observed that teachers have hesitations about taking responsibility. In the study of Benjamin et al., (2021), Finnish teachers were reluctant to discuss the themes of terrorism and extremist ideologies with their students due to the concern of not having enough knowledge. In Gertsen's (2022) study, if the classroom where teachers teach is crowded, they exhibit unethical behaviors that are more strictly adhered to the curriculum away from improvisation. Although the ethical behavior principles of teachers are guaranteed by laws, regulations, and directives, they may act unethically when they encounter different problems while performing their profession. In this process, teachers are provided with psychological support to overcome the negative situation (Abiogu et al., 2022). Ultimately, the job affiliation of professionals who have internalized ethical values increases (Akın et al., 2018). The pre-service ethics education of pre-service teachers who are preparing to practice this profession supports the social justice value of pre-service teachers (Mills, 2013). Pre-service teachers can act tolerantly and calmly with the education they have received as a requirement of the profession (Altunay Şam et al., 2016). Therefore, pre-service teachers who are prepared for their profession act by professional ethical principles (Eren and Rakıcıoğlu-Söylemez, 2017; Sakar and Aybek, 2015). Boon (2011), on the other hand, found that pre-service teachers lacked ethics education. It has been observed that pre-service teachers adopt dishonesty instead of academic honesty during their university education and do not display ethical behaviors (DiPaulo, 2022). In addition to receiving ethics education, the inadequacy of moral literacy of pre-service teachers puts the teaching profession at risk (Rizzo and Bajovic, 2016). Based on the literature, teachers comply with ethical values with the help of their education and character traits while performing their profession. Finding positive results, in general, can also be explained by the fact that teachers are subject to supervision by law.

According to gender, no significant difference was found in terms of the inclination of teachers and pre-service teachers to ethical values. When the literature is examined, it has been found that teachers have similar ethical inclinations according to gender (Altunay Şam et al., 2018; Sarıgül and Kana, 2018; Toprakçı et al., 2010). While these studies support my research results, different results have been obtained in the literature. In the study of Çelebi and Akbağ (2012), it was seen that female teachers attach more importance to ethical behaviors than male teachers. In addition, it has been concluded that women's perception of teaching professional ethics is better (Kayıkçı and Uygur, 2012; Burakgazi et al., 2020). In the studies conducted with pre-service teachers, some studies resulted in favor of female students (Bulut et al., 2021; Doğaner and Özbek, 2019; Obuz, 2009; Pelit Güçer, 2006), and research findings that resulted in favor of male teachers candidates (Altınkurt and Yılmaz, 2011; Kalenskyi et al., 2021). In addition, while the ethical values of power and tradition result in favor of men; women are in good standing in ethical values of self-control,

benevolence, success, compliance, and security (Dilmaç et al., 2009; Belet Boyacı et al., 2017). Based on the literature, the ethical orientations of those who practice the teaching profession do not differ in their gender, or results in favor of women are observed. Positive results were obtained for both male and female pre-service teachers. In general, it can be said that women give more importance to ethical values. Women's view of values stems from their value beliefs (Dilmaç et al., 2009). The absence of gender differences in research results is a desirable development in terms of commitment to ethical values. The fact that all teachers who carry out the teaching profession in Turkey are committed to ethical values will be effective in eliminating the negativities. The commitment of male and female teachers to ethical values is the biggest investment in education.

Those who have a teaching status are more inclined to ethical values compared to pre-service teachers who have not started their profession yet. Teachers are particularly inclined to the value of love. When examining the literature, Sarıgül and Kana (2018) found that teachers are prone to ethical values. Secondary school teachers who want to help their students are very willing to receive education for diverse inclusive education and want to show ethical behavior to every student (Triviño-Amigo et al., 2022). Pre-service teachers are also very willing to act ethically towards inclusive education (Chiva-Bartoll et al., 2021). Pre-service teachers are expected to form the preliminary foundations of professional ethics knowledge during their professional preparation (Dawson and Napper, 2020; Izadinia, 2013). Pre-service teachers face educational difficulties in internship practices, which is the first stage of starting the profession (Mills, 2013). In addition, the problems that pre-service teachers who will work in different geographies will encounter vary (Frederiksen et al., 2012). Pre-service teachers who face these problems strengthen their professional ethical behaviors by overcoming difficulties over time (Johnson and Reiman, 2007; McHan et al., 2022). Based on the literature, it can be concluded that both groups are prone to ethical values. The fact that the ethical orientations of educators with teacher status are better than pre-service teachers can be explained by professional maturity.

In the comparison made according to the branches of teachers and pre-service teachers, it was seen that those who were in physical education and sports branches were more inclined toward the ethical values of justice and cooperation compared to other branches. When the literature is examined, ethics education from different faculties affects career development at different levels (Beauvais et al., 2021; Burakgazi et al., 2020). In the study of Bulut et al., (2021), the perceptions of unethical behaviors of university students receiving pedagogical formation education, according to the department, "physics/chemistry/biology" departments reject unethical behavior the least; “Fine arts” students were the students of the department who rejected ethical behavior the most. In the study of Çelebi and Akbağ (2012), "mathematics-science" teachers gave less importance to "sense of duty" and "virtue" values compared to other branch teachers. In the study of Burakgazi et al., (2020), the ethical perceptions of primary school pre-service teachers were found at a better level than in other branches. In another study, preschool teachers' ethical perceptions were found at a good level (Duran, 2014). Physical education teachers and pre-service teachers thought that physical education lesson is effective in inclusive education, enabling students to experience sociocultural diversity and find their own identity (Chiva-Bartoll et al., 2021; Manzano-Sánchez et al., 2021; Rojo-Ramos et al., 2022). The behavior of physical education teachers to comply with professional ethics is quite good (Doğaner and Özbek, 2019). While these findings obtained from the literature support the research results, there are also findings that the teaching branch does not affect ethical values (Altunay Şam et al., 2016; Uğurlu and Sert, 2020). Predisposition to ethical values is closely related to education and character traits. Research findings with different results can be explained by this relationship.

When teachers were compared according to their professional seniority, those with 16 years or more experience were found to be more inclined to the ethical values of love, justice, and cooperation. The lowest scores were measured in teachers who were new to the profession. When the literature is examined, Sarıgül and Kana (2018) found that teachers with 11-15 years of professional seniority have higher ethical scores in the ethical value of love and justice than teachers with less than 5 years of experience. Again, the scores of those with more than 21 years of professional experience in the value of love were found to be higher than those with less than 5 years of experience. In the study of Toprakçı et al., (2010), as the professional seniority of primary school teachers increased, there was an increase in the behavior of complying with ethical values, and the highest scores were measured in teachers with more than 26 years of service. As

their professional seniority increases, teachers' commitment to virtue and professional ethics increases (Celep and Çetin 2005; Çelebi and Akbağ, 2012; Kayıkçı and Uygur, 2012). Junior teachers have more negative ethical perceptions compared to senior teachers (Gertsen, 2022; Şişman and Acat, 2003). The teacher, whose behavior pattern against negative situations becomes clear over time, performs his duty better (Kalenskyi et al., 2021). The information obtained from the literature confirms the study findings. The high expectations and excitement of teachers who have just started their profession can bring along many problems. As the professional seniority of the teacher's increases, it clarifies the behavior patterns that they can and cannot do against their students and their environment. This situation allows teachers to act according to professional ethical principles.

The ethical inclination of the participants who did physical activity was found to be higher. When the literature is examined; Those who engage in physical activity can stay away from unethical behaviors as a result of the positive behaviors they learn from training and their teammates (Ediş and Gündüz, 2019; Öztürk Karataş and Karataş, 2021; Temel, 2022). In addition, physical activities are very useful for collaborating with students with disabilities (Rojo-Ramos et al., 2022). These findings support the research results. It can be said that interacting with other individuals during physical activity improves ethical values. Due to the nature of sports, an understanding of tolerance towards different cultures can be developed by meeting different groups of friends. To win, it is necessary to act in cooperation (Temel, 2022). It is a normal result that educators who act in this way exhibit behaviors that are inclined to ethical values.

Recommendations

As a result of the research, it was found that the level of ethical values of teachers and candidate teachers is at a very good level. Based on this result, it is recommended that the activities related to ethics education for teachers and pre-service teachers should be increased and continued.

Recommendations for Further Research

In-depth research is recommended to examine why teachers who engage in regular physical activity have a high ethical orientation.

Recommendations for Applicants

It is recommended to determine possible problems by conducting experimental studies on ethics.

Limitations of Study

The research is limited to 784 teachers and 521 pre-service teachers from 15 different branches who voluntarily participated in the research from each region of Turkey in the 2021-2022 academic year.

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Conflict of Interest

The authors declare that they have no conflict of interest. Dr. Ahmet Temel took part in the writing of the article. Assoc. Prof. Dr. While Murat Kangalgil contributed to the English translation; Assoc. Prof. Dr. Hüdaverdi Mamak made the necessary arrangements by making the final reading of the article. Instructor Tevfik Emre and Ph.D. Student Ebru Aydın took part in the data collection phase.

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Research Article

Exploring health sciences students' experiences of interprofessional education to improve quality learning outcomes

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Abstract

Interprofessional education (IPE) is a practical pedagogical approach to strengthening teaching and learning in higher education to improve students' competencies. These competencies include an enhanced understanding of content knowledge and skills from different professions. To ensure quality teaching and learning, it is envisaged that IPE will strengthen and advance the knowledge and skills of students. The COVID-19 pandemic offered the opportunity to adopt multiple approaches to support students in acquiring the knowledge, skills, values and attitudes towards the programme through the support of interprofessional educators and resources. However, there is a lack of research to explore students' experiences and views on IPE in an acupuncture programme within the South African context, particularly with technologies. This study was anchored in the Technological, Pedagogical, Content Knowledge model as a theoretical lens to explore students' experiences of the IPE using technologies. The authors employed an interpretivist paradigm within a qualitative case study design. They used purposive sampling as a technique since the participants in this study were acupuncture students at a South African university. The researchers interviewed six (6) undergraduate students for this study. The findings revealed that students showed positive attitudes towards IPE. They believed the IPE would improve their competencies in clinical practice. Results also suggested that specific programmes should allocate sufficient time for IPE. Institutions should provide professional training to academics since IPE require more comprehensive content knowledge and pedagogical approaches. To promote effective teaching and learning, IPE should be the norm at universities. Universities should provide relevant support for the appropriate implementation of IPE from policy and resource perspectives.

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Introduction

In recent years, interprofessional education (IPE) has gained increasing attention in teaching and learning at higher education institutions (HEIs) in various fields (Ratka et al., 2017). The reason is that educators agree that IPE is a practical approach to improving students' competencies and skills. From a medical teaching perspective, these competencies and skills aid in promoting and ensuring optimal patient care in the real world (Reeves et al., 2012). Interprofessional education is defined as academic activities when professionals from different healthcare fields participate in teaching and learning simultaneously (Barr & Low, 2013; Treadwell et al., 2014). It provides an opportunity for students to gain an in-depth understanding and experience of the practice from different professionals. This view concurs with Müller and Couper (2021), who suggest that to cope with the complexity of patient care and health care systems, IPE and collaborative practice are recommended in undergraduate clinical training and, where clinical and contextually relevant, have merit in improving comprehensive patient management. This approach (IPE) can be further supported through various resources, such as technologies. For this study, the focus is on the IPE in the acupuncture programme.

Background to Acupuncture and Interprofessional Education

Acupuncture is widely accepted globally as a form of healthcare service. It is one of the modalities of Traditional Chinese Medicine (TCM) that is performed by inserting needles on specific points of the body to prevent and treat various diseases (World Health Organization [WHO], 2019). The authors identified IPE as a necessity to strengthen and enhance students' competencies of acupuncture knowledge and skills. Girard (2021) and Müller and Couper (2021) agree that IPE is an effective means to optimise patient care by promoting students' competencies in clinical practice through knowledge and understanding from different professionals in the field. Despite scholars contending on the importance of IPE, the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) (2021) points out that there is a lack of a shared vision of an educational framework for IPE. For this reason, IPE is rarely implemented in higher education institutions to promote and strengthen students' knowledge and understanding of content.

At their institutions, the authors have noticed that most programmes are still trained in silos, which limits students' exposure to other disciplines. This may negatively affect students' competencies in their practice and communications with professionals in other fields. Furthermore, most programmes at HEIs focus mainly on traditional teaching and learning (Hu & Venketsamy, 2022a). The COVID-19 pandemic offered the opportunity to adopt multiple approaches to support students in acquiring knowledge, skills, values and attitudes towards their respective programmes. One such approach was teaching and learning through technology, collaboration and engagements with other professionals in teaching activities.

In South Africa (SA), acupuncture is classified as a 'scarce skill' due to the fewer acupuncturists available in the country (The Allied Health Professions Council of South Africa [AHPCSA], 2020). Consequently, the authors believe that there is a need to improve the capacity of training high-quality acupuncture service providers by strengthening pedagogical approaches, such as IPE. For this reason, the authors intended to explore students' experiences and views of the IPE in the identified acupuncture programme at a public HEI in Gauteng province.

The authors adopted a qualitative case study design to explore students' views and experiences on IPE and the use of technologies in the identified acupuncture programme. The conceptual framework used in this study was the Technological, Pedagogical, Content Knowledge (TPCK) model developed from Shulman's (1986) Pedagogical Content Knowledge (PCK) model and the Technological, Pedagogical and Content Knowledge (TPACK) model developed by Mishra & Koehler (Venketsamy & Hu, 2022). The TPCK model emphasises content knowledge (CK), PCK and technological content knowledge (TCK). The findings of this study contributed to gaining an in-depth understanding of students' experiences with IPE in the acupuncture programme. This further assisted in strengthening the quality of acupuncture education through collaboration and partnership with other professionals. This study also

contributed to a pilot study for a hybrid model of IPE in complementary medicine in higher education in the South African context.

Literature Review

To gain an in-depth understanding of IPE in the acupuncture programme in SA, the researcher conducted a literature review of recent publications, text and other sources.

Explanation of Interprofessional Education

Interprofessional education is not a new concept in health care education, despite it gaining increasing and extensive attention in recent years. From the literature, there is a lack of uniform definition of IPE. The World Health Organization defines IPE as learning activities that involve two or more professionals to enable effective collaboration and improve health outcomes (Olenick et al., 2010; Yan et al., 2008). Barr and Low (2013) articulate that IPE is a teaching and learning process that promotes health care quality through collaborative work. Kitto et al. (2013) emphasise that IPE must take place when two or more professions engage in one activity simultaneously.

On the contrary, Johnson (2016:4) emphasises that IPE refers to "students from multiple disciplines learning about, from, and with each other's disciplines." Angelini (2011) states that interprofessional education is more commonly used than interdisciplinary education, which refers to different disciplines working together without much interaction. Despite the different emphases in the definition of IPE, all these researchers concur that IPE aims to promote students' learning outcomes to improve patient care in medical education. They further contend that IPE offers an opportunity to achieve effective collaboration and improve patient quality of health care (Barr & Low, 2013; Johnson, 2016). In this study, the authors contend that IPE refers to an umbrella term as an interdisciplinary education where students learn from two or more professionals from different fields to improve learning outcomes to optimise patients' health outcomes.

Significance of Interprofessional Education

Interprofessional education allows students to learn together to develop attributes and skills effectively and efficiently (Reeves et al., 2012). Treadwell et al. (2014) further assert that collaboration in the education of different fields significantly improves students' competencies in optimising patient care. Therefore, IPE plays a significant role in strengthening students' competencies in clinical practice, which further promotes healthcare services. This view is further supported by WHO (2013), revealing that IPE significantly enhances learning outcomes by effectively collaborative learning. Ratka et al. (2017) and Treadwell et al. (2014) state that IPE is an integral approach to optimise the healthcare system, measured by optimal patient outcomes through enhanced students' competencies. World Health Organization (2010) highlights that IPE promotes mutual understanding of content knowledge and skills from various medical fields. Students learn to work more effectively by collaborating with professionals in their teams from different fields (WHO, 2013). These scholars concur that the practical application of IPE will benefit students' competencies in clinical practice, which further optimises the delivery of service, patient care and safety.

Interprofessional education provides an opportunity for students to learn from different medical fields, which further enhances their knowledge and clinical skills. Barr and Low (2013) agree with Reeves et al. (2012), who claim that IPE meets the requirement of comprehensive health needs. Anderson et al. (2009) concur that IPE equips students with higher levels of skills through teamwork. They agree that there is a need for IPE in health sciences education to equip students with adequate content knowledge and skills to ensure students' competencies. The authors believe that IPE can be implemented and accommodated in any programme at higher education institutions. Reeves et al. (2012) further state that effective collaboration with professionals from different medical fields is fundamental for the complex nature of health care.

Interprofessional Education and the Acupuncture Programme

Acupuncture plays a critical role in promoting health goals due to its effectiveness and cost-effectiveness. Many countries acknowledge the importance of acupuncture in promoting public health (Hu & Venketsamy, 2022b). Li et al. (2019) report that the public increasingly accepts acupuncture since many medical conditions can be treated with acupuncture.

Yang et al. (2014) report that acupuncture regulates the balance of the body at the molecular level, which potentially impacts human diseases. From their study, Skjeie and Gardasevic (2013) conclude that acupuncture shows positive efficacies in many clinical conditions, especially concerning chronic pain. Both general health and the financial burden of medical services will be relieved by affordable quality acupuncture services (Kwon, 2014; WHO, 2019).

Consequently, the authors believe there is an urgent need to ensure the quality of acupuncture services. Therefore, it is crucial to ensure that acupuncture educational programmes are delivered through appropriate pedagogical approaches, such as IPE. To ensure that students receive the highest quality education in acupuncture, the authors concur that support from various professionals (IPE) will strengthen students' competencies.

Although acupuncture practices are available in many African countries, such as Zimbabwe, Botswana, Mauritius, Zimbabwe and SA (WHO, 2019), SA is the only country that provides formal acupuncture higher education in Africa. In SA, TCM (including acupuncture) higher education was first introduced at the University of Western Cape (UWC) in 2003 (Traditional & Natural Health Alliance [TNHA], 2018). However, this institution has discontinued all new enrolments as of 2019 (TNHA, 2018). In 2020, the University of Johannesburg (UJ) started offering an acupuncture programme for the first time to build the capacity for training professional acupuncturists in this country (UJ, 2021). To ensure the optimised learning outcomes of the acupuncture programmes, the authors believe that there is a need to adopt IPE in the acupuncture programme to promote students' competencies.

Figure 1

An IPE Class at the HEI (one conventional medicine practitioner was participating in the IPE section through Zoom meeting, while the rest of the class presented in a contact class.)

Strengthening Technology Use for Improving Learning Outcomes

Due to the impact of COVID-19, many HEIs shifted to emergency remote education (ERE). Emergency remote education is the urgent but temporary adjustment to an alternative mode of delivery in education (Hodges et al., 2020). Technology in this study refers to the internet. Tejedor et al. (2021) argue that the use of technology in education has been developed and implemented for decades to aid traditional face-to-face teaching and to learn to improve education outcomes. As a result of COVID and its restrictions, the authors argue that IPE can still be implemented through technology. Technology has provided both students and IPE professionals to interact with each other. Cloete (2017) states that the internet has become an essential technology in HEIs worldwide and this technology has created an opportunity for online teaching and learning. Budhwar (2017) agree with Cloete (2017) that students' performance and achievement can be improved by using technology and the support of IPE professionals. Chau (2010) further states that the barrier to access to education can be eliminated by using technology, reducing the financial costs of education. The relief of financial costs of education, such as IPE, is of great significance since the increased financial cost of IPE is a critical fact, particularly in African countries where poverty is still prevalent (Mellor, 2014; WHO, 2013).

Challenges in the Implementation of IPE

Despite scholars acknowledging the importance of IPE, many professionals are still trained separately (PACCARB, 2021). This lack of interaction between disciplines allows each to have its own culture, leading to a clash when disciplines do come together. There is a need to integrate IPE in the education of health sciences to overcome barriers in communication among professionals from different medical fields (Forte & Fowler, 2009; Treadwell et al., 2014).

Barriers to communication and collaboration among medical professionals are critical in clinical practice. For example, the inconsistencies in terminology and lexicons may result in misunderstandings and misinterpretation among professionals. This view concurs with Reeves et al. (2012), who report that patient safety is affected by poor communications among different professionals.

Experts in health sciences emphasise students' competencies in clinical practice to ensure that they (students) are competent, confident and capable of performing their clinical duties to optimise patient care. Frenk et al. (2010) reported that many professionals in the healthcare field enter practice without sufficient knowledge and practice for the delivery of interprofessional care. One of the reasons is the reluctance of clinicians to participate in educational activities due to their existing clinical workload (WHO, 2013). The limited clinical exposure is another challenge in ensuring students' competencies in clinical practice. Therefore, it is critical to develope an effective strategy to bridge the gap: students' competencies using acupuncture in clinical practice and communications with other healthcare professionals.

The lack of IPE in the acupuncture programme may negatively affect students' competencies in clinical practice to patient care. This may particularly affect the communications with professionals in other medical fields. Ratka et al. (2017) state that the transformation of IPE into practice relies on clinical instructors. The successful transformation of IPE will be achieved only if lecturers possess adequate content knowledge and skills of the specific modality to train students. These researchers concur that the implementation of IPE in healthcare education enhances students' competencies in clinical practice. The authors contend that there is a need to effectively support staff to conduct IPE in the acupuncture programme.

Conceptual Framework

This study was anchored within the conceptual framework, Technological, Pedagogical, Content Knowledge (TPCK) model as a theoretical lens to explore students' experiences and views on the IPE with technology in the acupuncture programme. This model primarily focuses on CK, PCK and TCK. Figure 1 below illustrates the outline of the TPCK model. Shulman (1986) contends that it is necessary to accommodate particular subject content knowledge with various pedagogical knowledge in education (Hu & Venketsamy, 2022a). The reason is that appropriate pedagogical knowledge in teaching and learning will improve students' learning experiences and promote learning outcomes (Venketsamy et al., 2021). Consequently, Shulman (1986) proposed the concept of PCK, which is defined as the knowledge utilised for particular content knowledge to enhance learning outcomes (Kultsum, 2017).

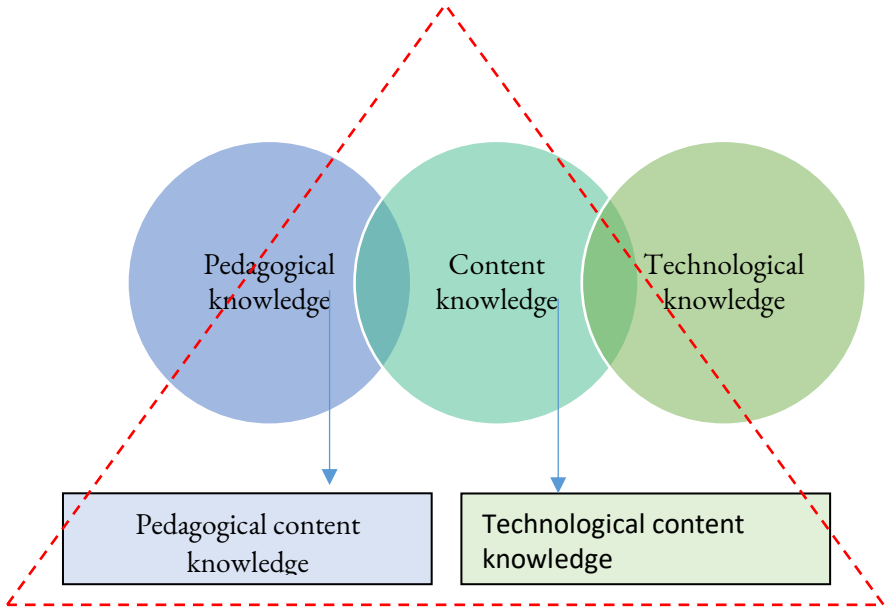

Figure 2

The TPCK Model (Own model adapted according to Shulman [1986] and Mishra & Koehler [2006])

Pedagogical content knowledge refers to knowledge of particular teaching techniques utilised to deliver specific content to strengthen learning outcomes (Kultsum, 2017; Shulman, 1986). PCK is the blending of content and

pedagogy to enhance understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and levels of students' abilities. To understand how to integrate technology in teaching and learning, Mishra and Koehler (2006) proposed adopting the TPACK model. This model was built upon Shulman's PCK model to promote effective teaching by integrating pedagogical, content and technological knowledge (Hu & Venketsamy, 2022a; Koehler et al., 2013).

There are seven elements in the TPACK model, which are derived from three core components, pedagogical knowledge, content knowledge and technological knowledge (Oner, 2020). Koehler et al. (2013) explain that the appropriate integration of the three core components further generates four other types of knowledge. This knowledge includes PCK, TCK, technological pedagogical knowledge and TPCK. The technology component of this model has a significant impact on this study since the HEIs were implementing online teaching and learning (Hu & Venketsamy, 2022a).

The TPCK model proposed for this study emphasises the importance of CK, PCK and TCK. Content knowledge refers to knowledge of specific subjects for achieving required learning outcomes for teaching and learning (Bhukuvhani, 2018). Technological content knowledge demonstrates the knowledge of applying appropriate technology to represent particular CK in education to promote teaching and learning (Koehler & Mishra, 2009; Koehler et al., 2013). The authors believe that the TPCK model provides a basic assumption of employing appropriate pedagogical approaches and technology to particular subject content knowledge to strengthen learning outcomes. Therefore, it is applicable to be utilised the teaching and learning at HEIs during the COVID-19 pandemic. Consequently, the authors believed that the TPCK model was a sound theoretical lens to explore the dynamic elements in education with technology.

According to the TPCK model, technology must be well understood and grounded before implementation. The utilisation of the TPCK model in this study assisted in analysing students' experiences from different perspectives, which further assisted in developing recommendations to strengthen IPE in the acupuncture programme. The authors believed that the TPCK model was suitable for this study since it provided practical approaches to analyse the phenomenon from technological, pedagogical and content knowledge perspectives.

In this paper, the authors employed the TPCK model to explicit students' views and experiences of IPE.

Research Problem

The primary research question

- How do students experiences IPE in the acupuncture programme?

Secondary research questions

- What are students' experiences with IPE in the acupuncture programme?
- What are students' views on the use of technology in IPE?

Method

Research Design

In this study, the authors adopted a descriptive qualitative single case study design with an interpretivist paradigm to explore participants' experiences with IPE in the acupuncture programme at the identified HEI. Venketsamy and Wilson (2020) agree with Yin (2018), who state that a case study is an approach to investigating and examining one or a few sites and providing in-depth explorations of phenomena. The interpretive paradigm refers to an approach used to understand and comprehend the truth and knowledge of the natural world (Hu, 2022). The interpretivist paradigm was appropriate for this study because it was a subjectivist epistemology that relied on the researcher's understanding and comprehension when making sense of participants' experiences (Creswell, 2014).

A single case study design was selected for this study. This method offered an opportunity to explore and make meaning of participants' experiences. Yin (2018) agrees that studying a single case provides a particular in-depth investigation of significant factors of the phenomenon. The Complementary Medicine Practice 3 (COPCMY3) module in the Bachelor of Health Sciences in Complementary Medicine (BHSsCM) at the identified HEI was selected as the case in this study. The reason was that IPE was adopted in the COPCMY3 module to strengthen students learning of

clinically related content. During a typical IPE class, a professional from the conventional medicine field would join the class through Zoom meeting to discuss the topic presented in that section.

Participants

A purposive sampling strategy based on volunteers was employed to identify participants. The authors invited participants who responded to the advertisement placed as a poster on the notice board on the identified HEI campus. Those who met the inclusion criteria and consented were selected to participate in this study. The inclusion criteria were as follows: a. participants needed to be registered for the COPCMY3 module of the BHSsCM, and b. participants must consent and sign the acceptance forms for participation. A sample of six (6) students was selected as the participants in this study since there were only six students responded to the invitation and signed the consent form. Pseudonyms were used in the data analysis and reporting phases of the study. Table 1 illustrates a summary of the participants' information.

Table 1

Participants' Information

Participants	Gender	Age
P1	Male	23
P2	Female	24
P3	Female	27
P4	Female	24
P5	Male	23
P6	Male	26

Data Collection Tools

Formal permission from the head of the department was sought prior to the commencement of this study. All participants were invited to a focus group after the IPE section for this study. The focus groups took place between February and March 2022. Saturation was achieved in after the third focus group. The data was transcribed and organised into themes for thematic analysis.

Data Analysis

The six-step framework of thematic analysis proposed by Creswell (2014) was followed in this study to analyse the data. The six steps include familiar with data, coding, generating themes, reviewing themes, defining themes and writing up (Venketsamy et al., 2021). Qualitative validity criteria, including credibility, transferability, dependability, and confirmability, were ensured in this study by being audited by a second coder.

Ethical Committee Permission

A Research Ethics Committee approved ethical clearance at a public university in Gauteng Province (Reference: EDU137/21).

Results

Findings from this study highlighted that all participants shared a positive attitude and views towards IPE, and however, they shared ambivalent views on the use of technology during IPE. Three major themes emerged from the data during the coding process: a) Students' views and experiences of IPE; b) Students' experiences of the use of technology in IPE; and c) Strategies to improve IPE.

Theme 1: Students' Views and Experiences of Interprofessional Education

Despite their ambivalent views on IPE, all participants in this study agreed that the IPE would benefit them by improving their competencies in clinical practice. Participants concurred that IPE allowed mutual understandings with other professionals who would benefit from their competencies in working.

To this, P1 said: "*IPE helps me revise knowledge in diagnostics and internal medicine in conventional medicine, which I might have forgotten because I did not revise the content regularly*."

P2 mentioned:

> *"During IPE, both lectures explain the same medical condition from different perspectives, which makes us easier to understand a specific disease from acupuncture and conventional medicine points of view. More importantly, it makes our future practice safer for patients as we have a better understanding of when to refer patients and when to seek medical assistance from conventional medicine."*

P4 and P5 both contended that IPE allowed them to acquire a better understanding of the knowledge and skills from different fields.

P6 added:

> *"We cannot deny that we are in a society where conventional medicine dominates. We have to understand the medical term so that we can communicate with medical doctors. Because we will need to refer patients to medical doctors. In the meantime, we will also receive patients from referrals from medical doctors if they understand what we can provide to improve patients' care."*

The findings of this study also suggested that sufficient time should be allocated for IPE in the acupuncture programme since more time was required for the implementation of IPE. P1, P3, P4 and P6 indicated a lack of time for the IPE in the acupuncture programme. P3 stated: *"I would prefer if more time could be allocated to IPE sections. Because sometimes we are not familiar with the knowledge from other fields. I believe that a longer duration in the IPE will allow better understanding."*

Theme 2: Students' Experiences in the Use of Technology in IPE

Although technology has been adopted in education, especially during ERE, participants still express ambivalent views on using technology in IPE in the acupuncture programme. Some participants indicated that technology-enabled the implementation of IPE in the acupuncture programme since it was more convenient and affordable for medical doctors to join the discussion. According to P2 and P5, they were told that the availability of medical doctors had negatively affected the implementation of IPE in terms of time and high cost. P2 highlighted: *"Using the Zoom meeting in the IPE sections allows conventional medicine doctors to attend our class while still working in the clinics."* P5 added: *"It may be cheaper to invite medical practitioners to participate in the IPE sections through Zoom meetings since it significantly reduces the time budget."*

However, some participants also expressed their reluctance to accept using technology in the IPE. They believed that all clinical training should be delivered in person since the experiences from virtual classes were not the same as contact classes. P1 mentioned: *"I feel very different from online discussion. I prefer all lecturers present in contact classes. This is especially useful when demonstrating physical examination and other practical skills."* P4 indicated: *"I can learn better if I see the demonstration physically instead of online."* Both P3 and P6 stated that they did not acquire authentic experiences from the virtual discussion similar to the real world. P6 added: *"I am glad that we are in a contact class for the IPE sections, although the medical practitioners join us online. I feel more beneficial if everyone presents in contact classes."*

All participants agreed that technology had been an effective means of communicating online with IPE professionals across the globe. They further articulated the importance of online teaching and learning amidst the COVID pandemic.

Theme 3: Strategies to Improve Interprofessional Education

The findings of this study highlighted some strategies to improve the IPE in the acupuncture programme. They supported that institutions should provide academic and professional training since IPE requires more comprehensive content and pedagogical approaches. Both P2 and P4 pointed out that lecturers should be equipped with knowledge from different medical fields. To this P2 said: *"It makes the study more difficult if the lecturer does not fully understand the discussion with conventional medicine doctors."* P4 added: *"It would be great if our lecturers have an in-depth understanding of the content knowledge during IPE. I believe that the university should provide proper training for lecturers who conduct the IPE."* P5 indicated:

> *"We have various departments in our faculty which focus on different domains, such as complementary medicine, emergency service, nursing, environmental health, chiropractic, etc. It would be great if we had some*

classes with students and lecturers from different fields. I trust this will significantly improve our competencies in clinical practice and promote acupuncture. Because in this way, other medical fields also have a better understanding of acupuncture."

Summarily: Graphically

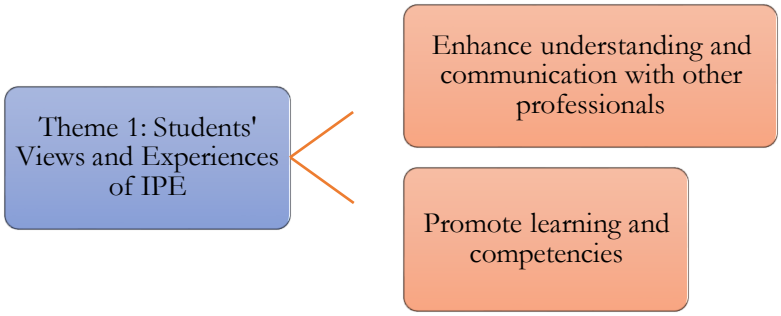

Figure 3

Codes of Theme 1: Students' Views and Experiences of IPE

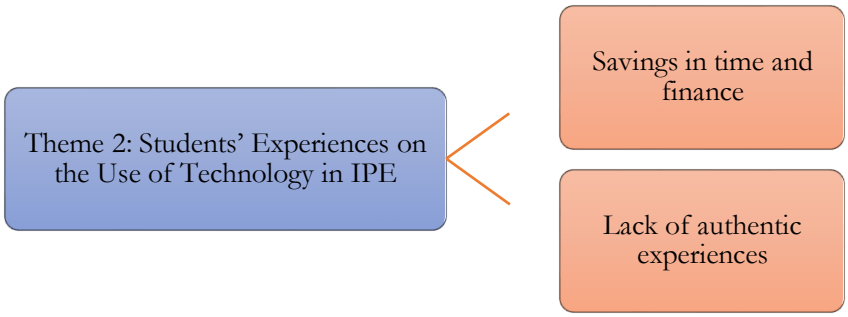

Figure 4

Codes of Theme 2: Students' Experiences in the Use of Technology in IPE

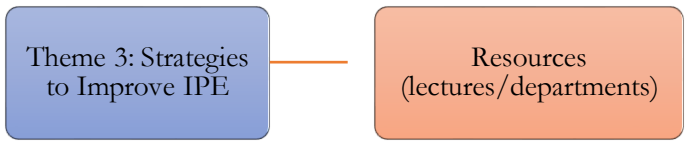

Figure 5

Codes of Theme 3: Strategies to Improve IPE

Each of these images is a graphical representation of the themes and the elements which were discussed above.

Discussion and Conclusion

Importance of IPE

Literature reveals that IPE is a practical pedagogical approach to strengthening students' competencies in health sciences (Johnson, 2016). Barr and Low (2013) and Reeves et al. (2012) concurred that IPE improves students' competencies to enable comprehensive needs in clinical practice. They agree that IPE significantly strengthened their learning which would benefit their future clinical practice in optimising patients' care (WHO, 2010; 2013). The findings of this study agreed with the literature that supported the importance of IPE in health sciences education. Participants in this study concurred that IPE promotes their learning and strengthens their competencies in clinical practice. The findings of this study contended that IPE offered an opportunity to improve learning outcomes which further enhances patient care.

Scholars, such as Frenk et al. (2010), acknowledge the importance of IPE in teaching and learning. Therefore, they agree that strategies should be developed to support the effective implementation of IPE (PACCARB, 2021; Ratka et al., 2017). However, the findings of this study concurred with the literature that there was a lack of interaction between

disciplines (Treadwell et al., 2014), and most professionals were still trained in silos. The authors contended an urgent need to develop strategies to support IPE at HEIs to promote students' learning and competencies.

According to the TPCK model, there are multiple perspectives in successfully delivering an educational programme, such as content and pedagogical content knowledge (Mishra & Koehler, 2006; Venketsamy, Smart & Hu, 2020). The PCK should be well structured to ensure the effective delivery of the content knowledge (Mishra & Koehler, 2006). The authors believed that adopting IPE as a pedagogical approach would benefit students' competencies in clinical practice. Interprofessional education was an appropriate pedagogical approach to delivering clinical-related content knowledge and skills. In their study, Venketsamy and Wilson (2020) highlighted the importance of content knowledge in the efficient teaching and learning in a programme. The authors believed that both PCK and CK should be well designed prior to the implementation of IPE in the acupuncture programme.

Technology Use in IPE

Technology is a crucial instrument in 21st-century education (Tejedor et al., 2021). The impact of COVID-19 promotes the shift to online teaching and learning through technology (Hodges et al., 2020). The findings of this study supported the literature that the effective use of technology will support teaching and learning (Budhwar, 2017; Cloete, 2017). The findings also concurred with Chau (2010) and Mellor (2014), who agreed that technology would allow education to be more affordable and accessible.

However, this study revealed a need to ensure the effective use of technology in the delivery of educational programmes. The reason was that not all CK was suitable to be delivered online, particularly in health sciences, where many practical skills were required. According to the TPCK model, technology is critical in promoting teaching and learning (Koehler et al., 2020). The authors believed that the adoption of technology in acupuncture should take into consideration specific content knowledge. Consequently, there was a need for institutions and educators to have a comprehensive understanding of particular TCK to determine how to use technology effectively for specific CK. This view concurred with Venketsamy and Wilson (2020), who emphasised the importance of technology in the twenty-first century to optimise education outcomes.

Conclusion

In conclusion, acupuncture is gaining increased interest globally. There is an urgent need to improve the capacity of training acupuncture service providers through quality educational programmes. This paper aimed to explore students' views and experiences on IPE in the acupuncture programme at the identified HEI in Gauteng. Interprofessional education is an effective approach to improving students' learning outcomes in health sciences. Despite research evidence of the effectiveness of IPE in promoting in-depth knowledge and understanding, this study found that most South African HEIs are focused on traditional teaching and learning. There is minimal collaboration among professionals within and outside of the institution. Interprofessional education provides an opportunity for collaborative teaching and students' professional development (Ratka et al., 2017). This view concurs with WHO (2013), which emphasises the significance of IPE in promoting learning outcomes in the field of health sciences. The interpretive approach and focus group allowed participants to share their experience and understanding of the IPE in the acupuncture programme and the value of IPE which added to their existing knowledge and understanding of acupuncture. The findings in this study will significantly contribute to the quality promotion of learning in acupuncture programmes in higher education within the South African context.

The TPCK model used in this study contributed to the analysis of the educational phenomenon in the 21st century, which places much emphasis on CK, PCK and TCK. To ensure effective teaching and learning, academic staff should possess comprehensive CK and PCK. This view concurs with Koehler et al. (2013) and Shulman (1986) who emphasise the importance of CK and PCK in education. The findings of this study also contribute to strengthening the effective teaching of clinical content knowledge at HEIs. Educators' in-depth understandings of the elements in the TPCK model will enhance their teaching practice in the real world through the effective integration of the elements in education. It

can be argued that IPE as a practical approach should be implemented in all HEI programmes to support students' learning.

Recommendation

The findings of this study reveal that students benefit from IPE in the acupuncture programme at the identified HEI. For the effective implementation of IPE, the authors concurred with the following recommendations:

- Effectively implementing IPE in the acupuncture programme – sufficient time allocation should be ensured to support IPE in the acupuncture programme. The use of technologies in IPE should be well-structured before the implementation of IPE. Lecturers should consider content knowledge in their lesson plans.
- Institutions should provide academic and professional training since interdisciplinary approaches require more comprehensive content knowledge and pedagogical approaches.
- To promote effective teaching and learning, interdisciplinary education should be the norm at universities. Universities should provide relevant support for implementing interdisciplinary education from policy and resource perspectives.

Recommendations for Further Research

The authors believe that this study should be explored more broadly at different HEIs. They further recommend that this study be conducted with various research paradigms to strengthen the findings. Therefore, future studies should be conducted using a quantitative paradigm or mixed methods approach. Further studies should also be conducted to investigate the effectiveness of IPE in other educational programmes involving clinical content knowledge at HEIs. Further studies are recommended to include a larger sample size to yield different results and recommendations; to investigate other technological and pedagogical approaches which can benefit teaching and learning.

Limitations of the Study

Since this study was conducted within a qualitative paradigm, the small sample size in the case study design negatively impacted the transferability of the findings. This study was also limited to exploring students' views and experiences on IPE at one HEI in Gauteng Province in SA. Subsequently, there was a lack of comparisons.

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Research Article

Example of thematic learning in early childhood science education: seed

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Abstract

The aims of the study are to prepare an instructional design that supports the development of children's basic scientific process skills for the seed theme and to examine the effectiveness of this design and to improve the awareness of preschool children about the concept of seed. In line with the purpose of the research, the changes in children's prior knowledge about seeds after implementing the activities that address the different skills in the acquisitions and indicators in the preschool curriculum were examined. The research was conducted with 198 preschool children attending a public preschool in the province of Izmir in the 2021-2022 academic year. The children's ages range from four to six years. During the research process, teachers were firstly given training about seed plants, flowering plants, fruit, seeds, and seed germination by academicians who are experts in the field of biology. The teachers who received this training also carried out eight activities with children about the topics of what the seed is, the importance of the seed, and the benefits of seed preservation. With the aim of determining the children's prior knowledge about seeds, open-ended structured questions developed by the researchers were asked to the children before the activities, and their answers were recorded. The same questions were asked after the activities were completed and the answers were recorded again. This study is a case study, one of the qualitative research methods. One-third of the children' answers were coded by two independent experts, and then preliminary codes were created. Afterward, all responses were evaluated with these codes. The results of the analysis determined that while the knowledge and awareness of the children about seeds were low at the beginning, this level increased after the study. The study is thought to contribute to teachers and researchers who develop activities on seed awareness and can be an example of how to develop thematic instructional designs science education in the preschool period.

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Introduction

Plants are in the first step of ecosystems' food chains in terrestrial and aquatic environments. Plant and other photosynthesizing creatures (producers) capture the energy entering an ecosystem as sunlight. These creatures absorb

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and transform the Sun's energy. Thereby, they store this energy in sugars and other complex molecules. These molecules then create food for a series of consumers, such as animals fed on by eating the producers (Urry et al., 2021; Cunningham & Cunningham, 2018; Mader & Windelspecht, 2018). About 326 thousand plant species have been defined so far in the world. 89 % (291 thousand) of these are seed plants (Urry et al., 2021; Bevanger, 2019). On the other hand, 290,000 of the seed plants consist of flowering plants, and very few of them are gymnosperm plants. Seed is the structure that enables reproduction in seed plants. It contains the embryo, which is a small outline of the plant. The seed consists of an embryo sack with a source of nutrients in a protective coat. When the seeds mature, they are separated from their parent plants by wind or other means. The seed can survive for days, months, or even years when released from the parent plant. Therefore, a seed can be described as a mobile model of a pregnant woman's uterus. Under proper conditions, the seed germinates. The embryo comes out of the seed coat as a sapling (young plant). Some seeds fall next to their parent plants, while others are carried far away by wind or animals. For seeds to germinate, proper temperature, water, air, and light changes are necessary. The fruit protects the encircled seed and helps attract seed-dispersing animals (Urry et al., 2021; Sadava et al., 2017). Seed plants have also had a tremendous impact on the human community. Around 12,000 years ago, humans began cultivating wheat, figs, corn, rice, and other wild seed plants. The domestication of seed plants, especially flowering plants (angiosperms), enabled the most important cultural change to reveal in human history. Gymnosperm plants typically bear ''naked'' seeds on the surface of the cone scales. The most crucial difference that distinguishes flowering plants from gymnosperm plants is that they have flowers and fruits (Urry et al., 2021; Freeman et al., 2020; Sadava et al., 2017; Simon et al., 2020). These different plant species can be distinguished from each other by the distinct characteristics of their organs (roots, stems, leaves, and flowers), such as morphological, anatomical, and molecular structures.

Various answers can be given to the question*, ''Why should biodiversity, including plants, be protected?''.* Our aesthetic values and the fact that they offer countless products to people are some of them. Undiscovered or unused plant species may be necessary for future uses such as food, medicine, vegetable fiber, fuel, rubber, and wood. Efforts should be made to educate individuals on the issues of nature, protection, and biodiversity from the youngest age they can academically comprehend. It is essential to instill love and respect for the aesthetic beauty of natural life, especially in children (Simpson, 2019; Belk & Maier, 2019; Simon et al., 2020*).* In this context, the Science Curriculum includes the acquisition of ''F.3.6.1.2. *The student presents the observation results of the life cycle of a plant''* (MoNE, 2018a, p.18). And the Secondary Education Biology Curriculum includes the acquisitions of ''9.3.2.1. *The student explains the realms used in the classification of living creatures and the general characteristics of these realms*. 12.3.3.2. *The student explains the fertilization and the formation of seeds and fruits in flowering plants.* 12.3.3.3. *The student designs experiments in which seed germination can be observed''* (MoNE, 2018b, p.18). When the basic characteristics of the preschool education curriculum are examined, it is seen that students' learning by discovery is a priority. In this context, the priority of learning by discovery is defined in the preschool education curriculum as follows:

> *"In learning by discovery method, it is important for the child to actively participate in the learning process, transfer what s/he has learned to different situations and use it in new situations. The program encourages the child to notice what is happening around him, to ask questions about the subjects s/he is curious about, to research, to discover, and to learn by playing. Thereby, meaningful learning takes place instead of rote-based learning (MoNE, 2013, p.16)."*

Starting from an early age, it is vital for a sustainable Earth to develop individuals' awareness of the environment and to understand the ecological importance of living creatures. From this point of view, the study aims to enable preschool children to comprehend the function of seeds in seed plants, the conditions of germination and embryo development, and to realize plant diversity.

Problem of Study

The main aim of this study is whether the seed theme-based teaching designed for the preschool period is effective or not. The following problem and sub-problem questions are determined.

Main Problem:

What's the effectiveness of seed theme-based teaching designed for the preschool period?

Sub-problems:

- What is the change in the knowledge about the concept of seed before and after the instructional design implementation?
- What is the change in the knowledge about the function of seed before and after the instructional design implementation?
- What is the change in the knowledge about the protection of seed before and after the instructional design implementation?

Method

Research Design

This research was conducted on the seed awareness of preschool children. The study was designed as a case study, one of the qualitative research methods. Case study is one of the qualitative research approaches in which one or more cases limited in time are examined in depth (Creswell, 2007). From this point of view, the study is consistent with case study as it evaluates the prior knowledge of pre-school children about seeds and follows the activities conducted during the two-month period and the new ideas they have developed about the seed.

Participants

The participants of the study consist of 198 children attending a public kindergarten in Izmir province in the 2021-2022 academic year. The ages of the participating children in the study range from 45 to 71 months. 48% (f=96) of the children are females; 52% (f=102) of them are males. Ethically, the study was conducted with the children who volunteered to participate in the study, and within the knowledge of their parents.

Study Process

This research was conducted in two different training stages. First of all, preschool teachers who would perform study on seeds with children received training from an academician who is an expert in the field of biology. Next, the teachers developed some activities appropriate for the developmental characteristics of preschool children. These activities were evaluated by field experts and organized in a way that would not allow scientific errors. Table 1 shows the developed activities below.

Table 1. Activities Developed for Research

Activity Name	Activity Type	Acquisition of the Activity	Indicators
Activity 1: What is seed?	Language Development	Comprehends what s/he listens/watches	* Fulfils verbal instructions. * Explains what s/he listens to/watches. * Comments about what s/he listens to/watches.
Activity 2: Revived seed	Cognitive Development	Predicts about the object/case/event	* Gives clues to the object/situation/event. * Predicts by combining the clues. * Examines the real situation. * Compares the estimated situation and the real situation.
Activity 3: What is inside the seed?	Cognitive Development	Observes objects or living creatures. Expresses what s/he listens to/watches in various ways.	*Tells the name of the object/living creature. *Tells the colour of the object/living creature. *Tells the shape of the object/living creature. * Tells the size of the object/living creature. * Tells the length of the object/living creature. * Exhibits what s/he listens to/watches through paintings.
Activity 4: Importance of seeds for plants	Language Development	Expresses what s/he listens to/watches in various ways.	* Exhibits what s/he listens to/watches through dramas. * Exhibits what s/he listens to/watches through stories.
Activity5: How	Cognitive	Establishes a cause-effect	* Tells possible causes of an event.

to reserve seeds?	Development	relationship.	*Tells the possible consequences of an event.
Activity 6: What do the seeds need?	Cognitive Development	Pays attention to the object/situation/event.	* Focuses on the object/situation/event that needs attention. * Asks questions about the object/situation/event that attracts her/his attention. * Describes the object/situation/event that attracts her/his attention in detail.
Activity 7: What plants are grown in our country?	Art Activity	Follows the directions about the location in the space. Prepares object graph.	* Places the object in the right place in accordance with the instruction. * Creates graphics using objects.
Activity 8: What if there were no seeds?	Language Development	Expresses what s/he listens to/watches in various ways.	* Exhibits what s/he listens to/watches through dramas.

After the activities were developed, pre-interviews were conducted with the children, and the data of these interviews were recorded. The activities designed were implemented for two months and every stages of them, from their implementation to the evaluation processes, were recorded. For example, children were asked to bring different seeds to the school in the first activity, and these seeds were examined as well as the seeds of cones and other plants discovered in the school garden. The visuals of this event are shown in Photo 1.

Photo 1. "What's Seed?" and "What's Inside Seed" Activities

As another example, in the fifth activity, the factors (temperature, humidity, light) that a seed needs in the process of becoming a plant were followed by experiment and observation. In Photo 2, there is an example of the data recorded by the students about their experiments.

Student data recordings about the development processes of the seed: The seed is at dark (upper left); it is unwatered and in a cold place (upper right); it is watered and in a cold place (lower left); it is at appropriate temperature, watered, and in a sunny place (bottom right)

Photo 2. An Example of Observation Form for "Revieved Seed" Activity

Photo 3 shows the visuals of the smart pots prepared by the students for the seeds to grow in the appropriate environment as a result of the observations made with the experiments.

Photo 3. Smart Pots Prepared by Students

Data Collection Tools

In the research, first of all, the answers of preschool children were recorded after they were interviewed by using semi-structured interview forms in order to reveal their prior knowledge about seeds. Then, the semi-structured interview form was evaluated by an expert in science and biology who studied a doctorate and a preschool teacher with a master's degree. Lastly, the research was started by common consent about its appropriateness for the age group. During the implementation of the activities, evaluation studies were carried out in accordance with the content of each activity while planning them, and students' progress was followed. Since these evaluations were performed for following the process, the results of these evaluations were not included in the findings. When all the activities were completed, it was aimed to determine whether there was a change in the prior knowledge of children about seeds by using a semi-structured interview form.

Data Analysis

For data analysis, the content analysis method was used. Content analysis is a detailed analysis method that follows the processes of coding the obtained qualitative data by independent coders, controlling the compatibility of the codes, and determining the themes created by the compatible codes. In this method, one-third of the data obtained from the semi-structured interview forms were analyzed by two independent coders, and preliminary codes were created. Miles and Huberman's (1994) percentage agreement between coders formula (the number of agreements/ the total number of codes x100) was applied for preliminary codes. Thus, the codes to be used to analyze all data were determined. For example, in the coding of the semi-structured interview form questions, the percentage agreement was 83% for the 1st and 6th questions; and 100% for the 2nd, 3rd, 4th and 7th questions.

Results

In this section, the answers given by the children to the semi-structured interview questions are presented in tables in the form of codes, themes, and sample opinions. To compare the preliminary knowledge and post-study situation, the pre-study and post-study opinions are given comparatively in the same table.

Conceptual Change for the Concept of Seed

For the findings in this category, the answers given to the questions of ''What is the seed?'', ''Is the seed alive?'' and ''What does the seed look like?'' were analyzed by combining them. The children's prior knowledge about the seed before the activities and the opinions they stated about the seed after the activities were coded and presented in Table 2.

Table 2. Pre-study and Post-study Opinions of Children on What a Seed is

Opinions	Theme	Codes	Sample Children Opinions
Pre-study	Vitality	Growing/developing/living	*C-42: A seed is something that grows when planted. There is a plant in it. It is alive because it grows. C-17: It is alive because trees and flowers come out of it.
		Inactive/nonliving	C-43: The seed is nonliving. It has no brain and no heart. C-34: The seed is nonliving because it does not speak to us.
	Image/Visual	A fruit	C-40: Seeds allow trees to form fruits. They grow and become fruit.
		A flower	C-1: You plant the seed, it becomes a flower. A seed is something like a flower. C-44: Seed means flower.
		A core	C-38: A seed is a core. It is nonliving, it has no body. It cannot see. C-36: It is the core of an orange, an apple. The seed is nonliving. It is in the fruits.
		Circle	C-26: The seed is circular and black. A tree grows from seed. C-21: It is a red, earthy, circular thing.
		Small	C-41: The seed is something like the sand in the garden. It is tiny. But it grows, becomes a flower. C-15: The seed is small. It grows and develops, it provides plants to live.
Post-study	Vitality	Has cells/alive	C-1: The seed is a sleeping baby. It has cells in it. It grows when watered and placed on the windowsill. C-17: The seed is alive. When you give water, it grows and develops. C-34: The seed cannot talk to us, but it is alive because it grows when we give water to it. C-43: It grows with water, so it is alive.

*C: Children

When Table 2 was examined, it was determined that the children had different opinions about the seed's being living and non-living before the study. Since they identify its livingness situation with themselves concretely, they regard the seed as nonliving; it is understood that some students claim that the seed can be living because it can grow. The children who inferred that the seed was a plant or part of a plant described it as a small, round-shaped structure that could be cultivated based on their observations. After the events, multidimensional perspectives and ideas were replaced by a more homogeneous definition. The seed is defined as a living structure that develops, grows, and sustains plant life under certain conditions.

Conceptual Change for Function of Seed

In this category, the answers to the questions of "What does a seed do?", and "What does the seed do for plants?" were analyzed by integrating. The codes created from the data obtained from the pre-study and post-study opinions according to the analysis results are given in Table 3.

Table 3. Children's Pre-Study and Post-Study Opinions on the Function of Seeds

Opinions	Theme	Codes	Sample of Children Opinions
Pre-study	Plant development	Growth of plants	*C-5: It provides plants to grow. C-58: It makes the plant grow.
		Flowering	C-2: It becomes a flower. If there is no seed, there will be no carrot, no watermelon, and no tomatoes.
	Benefit to humans	Forming a fruit/vegetable	C-15: Seeds grow plants. They form fruits and vegetables. C-42: It enables the plant to bear fruit.
		Healthy for humans	C-9: It keeps us healthy because we eat the seeds. C-40: It allows us to eat fruits and vegetables.
Post-study	Plant development	For plants to survive	C-2: It ensures for the plants grow and develop. C-15: Roots come out of the seeds of plants, the seed cracks, grows, and forms the plant. C-42: It makes the plant grow. C-58: Seed keeps the plant alive.

*C: Children

When Table 3 is examined, it is seen that the majority of children thought that the seed enables the plants to grow, enables them to bloom, and contributes to the creation of nutrients for humans before the study. However, after the activities were carried out, they started to think that the seed is a part of the plant's life cycle, and that the plant needs seeds to continue its life.

Conceptual Change for Protection of Seed

In this category, the answers to the questions of "Do you think it is beneficial to store seeds? Please explain why.", and "Do you think having our own seeds is beneficial in the future? Why?" were analyzed. The codes created from the data obtained from the pre-study and post-study opinions according to the analysis results are given in Table 4.

Table 4. Opinions on the Importance of Seed Collection and Storage

Opinions	Theme	Codes	Sample of Children Opinions
Pre-study	Benefit to humans	Becoming a tree/ blooming	C-12: A flower becomes a seed and a tree grows. To have a tree, we must store seeds. C-43: We make new flowers from seeds.
		Forming a fruit/vegetable	C-57: Yes, saving seeds is beneficial. Because they form fruits and vegetables. C-7: We must save the seeds, they will be food for us.
	Safety	Preventing it from being stolen	C-2: We must keep our seeds so that others cannot take our seeds. C-8: In order that our seeds are not stolen, we should keep them in the drawer. C-22: We must hide our seeds in a place where no one knows, so they do not take them.
	Negative opinions	It does not bloom/plant does not grow	C-1: Let's not hide the seeds, let them all bloom. They can't grow if we hide them. C-45: If we store the seeds, they will not grow. So storing is not a good thing.
Post-study	Sustainability of plant life	For plants to live	C-1: Storing seeds allows us to grow plants later. We plant seeds, we water them, and then we have plants. C-7: We will need stored seeds to grow plants. C-12: If we store our seeds, we use them to grow plants in case of fire in the future. We sow them, and they become trees.
	Benefit to humans	For nutrient production	C-21: We sow seeds later to grow tomatoes and carrots. C-10: We plant seeds in our garden to grow fruit and vegetables. That's why we need seeds.
		Giving strength	C-2: Storing our seeds gives us strength.

*C: Children

When Table 4 is examined, the children are seen to have negative opinions as well as positive opinions about seed preservation in the pre-study interview. Children have the idea that storing seeds will prevent plants from growing. In addition, the word ''storing'' formed a concrete meaning for children in this period, such as hiding, keeping it from thieves, and the children thought that it was necessary to hide the seeds for security reasons. The idea about the use of seed storage for later consumption as a nutrient was a common idea both in the pre-study interview and in the post-study interview. However, in the pre-study interview, it was determined that the children who stated the idea of seed's benefit to humans for growing fruit and vegetables changed their minds in the post-study interview. They emphasized the idea of its benefit to the plants as stating that the plants could continue to live because of seeds, and seeds contribute to the cultivation of new plants.

Discussion and Conclusion

This study aims to develop the awareness of preschool children about the concept of seeds. In line with the aim of the research, changes in the prior knowledge of children about seeds as a result of the activities carried out were examined. Furthermore, the prior knowledge of children about what a seed is and its function were also studied. In the study, it was found that children had prior knowledge that the seed is alive because it is a growing/developing structure, and nonliving because it is inactive. It has been observed that children resemble seeds to different parts of the plant (flowers and fruits) in shape and image.

Moreover, it has been determined that they have preliminary information about the growth of plants, flowering, forming a fruit/vegetable, and functions for humans. According to the results of the research, it can be said that there are scientific errors in children's prior knowledge of what the seed is (definition) and its function. It is thought that the lack of sufficient knowledge of preschool teachers about science concepts is a cause of this situation.

Önal and Kızılay (2021) emphasized that teachers should have high-level knowledge in order to teach preschool science concepts. On the other hand, Şimşek, and Çınar (2012) stated that for effective science education, preschool teachers should have knowledge about basic concepts (electricity, magnetism, acid, and base, etc.), especially about plants and the environment. However, studies in the literature have shown that preschool teachers do not have sufficient knowledge of science concepts (Cho, Kim, & Choi, 2003; Dağlı & Dağlıoğlu, 2020; Kallery, 2004; Yıldız & Tükel, 2018). For example, Dağlı and Dağlıoğlu (2020) determined in their study that teachers' lack of knowledge about science concepts was effective in not including scientific activities in pre-school education. Within the scope of this study, the children were determined to make different definitions from each other when describing the seed before the research. However, as a result of the activities carried out in the research, they made similar definitions of seeds. The children defined the seed as the structure that develops under certain conditions and enables the plant to survive. According to the study results, it can be said that children's participation in activities addressing different skills is effective in eliminating scientific errors in their prior knowledge about seeds. When the literature is examined, it has been seen that applied activities in which children directly participate are very effective in teaching science concepts to children in preschool education (Sadikoglu & Durmuş, 2022). As a matter of fact, according to Morgan et al. (2016), the implementation of science activities and the experiences will lead to an increase in the future science success of preschool children.

In the research, the children's opinions about the importance of collecting and storing seeds have been determined. Children stated that seeds should be stored in terms of benefit to human, safety, and flowering/plant growth. However, the children emphasized after the activities that the seeds should be protected for the plants to survive and for benefit to human. According to these results, it can be said that the developed activities helped children to build different understanding. Looking at the world with a scientific perspective, encountering natural and technological events, and taking part in processes such as decision-making and discussion have contributed to children (Stylianidou et al., 2014). Hereby, activities that preschool teachers will develop for different science concepts in early childhood are essential for sustainable education (Borg, Winberg, & Vinterek, 2017; Engdahl, 2015; Koca, Aydın, & Sert, 2022). In addition, offering different learning environments to children contributes to their cognitive, mental, and emotional

development (Karakaya, Yılmaz & Bozkurt, 2022; Sadikoglu & Durmuş, 2022). When the literature is examined, it is seen that the implementation of activities involving science concepts in the preschool period allows children to gain curiosity, interest, and different perspectives towards concepts (Bosse, Jacobs, & Anderson, 2009; Durmuş, 2021). According to Alade et al. (2016), activity-oriented science education should be applied to develop the processes of problem-solving, creative thinking, and discovery in preschool children. Moreover, studies have also shown that it is essential for preschool teachers to implement activities that are fun, gain life experience, and include different skills for science education (Sağlam & Aral, 2015). These results support the findings of the study.

Within the scope of this research, the concepts of seed plants, flowers, seeds, and germination of seeds, which are expected to be learned in science and biology courses by students in primary, secondary, and high schools, were practically taught to preschool children. Similar studies can be planned for other concepts in science. It is thought that the reason for the successful results of this research is that the teachers' level of content knowledge about the subject was improved before the study. Teachers who firstly internalized the concepts were very successful in reducing the practices to the children's levels and gave scientifically correct answers to the children's questions. For this reason, conceptual knowledge of teachers, who are practitioners in science activities planned for children, are expected to be at sufficient level. The teachers found it very helpful to be informed by experts before the implementation process, and they stated that they had not received this knowledge during their undergraduate education. One of the most important outputs of this research is that children can easily learn the concepts that are taught. This is because a child can individually participate in all stages of the activities and interpret the results of the practices alone. It is thought that making similar plans and practices for other subjects in the program would be beneficial.

Recommendation

Recommendations for Further Applicant

In this study, seed-themed activities were developed for the preschool period to support the development of children's scientific process skills. In the studies to be carried out, different themes from this theme can be focused on. For example, a study can be carried out on the parts of plants that can be encountered in daily life and open to observational activities and their development. In this study, conceptual change was examined. Researchers can replicate this study by focusing on its effects on children's science process skills.

Limitations of the Study

This study is limited to the changes in the knowledge of preschool children about the concept of seed. In terms of the study group, it is limited to children age 4-6 years.

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Research Article

Teaching practices and evaluation with distance education of gifted students

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Abstract

It is known that gifted individuals who receive education in Science and Art Centers (SACs) in Turkiye have problems in reaching different educations in accordance with their individual competencies . This study aimed to determine the expectations of gifted students towards distance education, to show that this training can be given with the distance education method after the courses offered through distance education, and to develop an alternative way for the future. Explanatory sequential design, one of the mixed research types in which quantitative and qualitative research designs are used together, was employed in the research. The study group of the research consisted of 40 gifted students and 40 parents of these students in three SACs in Turkiye. The quantitative data of the study were analyzed by using the SPSS program. Quantitative data of the study were obtained with a "10-items student online learning expectations form and 5-items parent evaluation form". Qualitative data of the study were obtained with an 8-items student self-evaluation form. In the research, 4 weeks of distance education were given to the students; "Astronomy, Thinking Skills, Teaching Mathematics with Origami, Robotic Coding, Intelligence Games and Values Education" lessons were explained, and the data obtained at the end of the application were analyzed and interpreted with the MAXQDA program. As a result, it is revealed that gifted students in SACs are quite satisfied with the distance education training within this study's scope. In addition, the present study showed that education programs can be rearranged and made suitable for distance education for the emergent transitions to distance education that emerged with the Covid-19 pandemic.

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Introduction

In a world where technology is used intensively, the limits on accessing information have been removed, and individuals can easily access education in different places from where they are. It is significant to offer the education that individuals need. In recent years, developments in distance education have begun to be seen as an alternative to meeting the educational needs of individuals. Meeting the educational needs of especially talented individuals is extremely important for the future of Turkiye. It is inevitable that these students, who are different from their peers, should be given supportive education outside of formal education. Special talent can be defined as having more creative, successful, and high-level skills than one's peers (Şenol, 2011). In Turkey, Science and Art Centers (SACs) undertake the training of gifted individuals. SACs are educational institutions affiliated with the Ministry of National Education that prepare

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special curricula for gifted individuals by revealing the potential of gifted individuals who receive the same education as other students in formal education. SACs were established to provide education in the fields of science and art for gifted individuals affiliated with the General Directorate of Special Education and Guidance Services of the Turkish Ministry of National Education (TMNE). These educational institutions are independent and carry out studies to provide special talented individuals with appropriate education according to their talents at primary and secondary education levels (TMNE, 2016). In Turkiye, gifted students are educated in SACs. Three skill areas are based on student selection for SACs. These are talent, painting, and music. Students can be shown as gifted in at most two of these fields (TMNE, 2015). The education of gifted individuals is vital for the future of countris. These students need special differentiated education. SACs in Turkey undertook the task of executing the education of gifted children. SACs are not an alternative to formal education institutions, they have the role of supporting formal education (Delibay, 2017). SACs, which offer a differentiated education program different from the education given in normal schools, serve with 106 SAC centers in 80 provinces so that gifted individuals can realize their potential and contribute to themselves and the society (TMNE, 2016).

There are courses that gifted individuals can't take even if they want, and teachers they can't reach to take lessons. It is observed that special talented people have problems in accessing these training due to various reasons such as lack of training that interests these learners, and trainers, who will offer training to these special talented learners, transportation problems, and physical disability of the individuals Lee, Fanguy, Lu, and Bligh; 2021). Appropriate education plans for gifted individuals continue in the world. The important thing here is to integrate these programs with the developing technology and to design them in accordance with the culture of the country. The general structure of the education programs for the education of gifted individuals in Turkiye has been determined as mentoring based on the individual's bridge with the university (Tortop, 2013).

This study aims to go beyond the existing borders and present an alternative education to gifted individuals through distance education and deliver this training to gifted individuals. It can be stated that distance education can be a good alternative to the educational needs of gifted individuals. In addition, arranging education programs for the needs of gifted individuals and offering them to students with the help of distance education will provide equality of opportunity and educational richness among SAC students. In a study by Kaçan and Gelen (2020), many higher education institutions with distance education applications; concluded that they provide distance education with undergraduate completion, undergraduate, associate degree, graduate, certificate, and various training programs, and they carry out their education simultaneously and asynchronously in printed materials, computer-assisted, web environment. The fact that distance education has such widespread use has created the idea that it can also be used in the education of gifted students.

Especially during the COVID-19 pandemic period, it is seen that SAC students' online learning expectations are formed, and their online learning expectations are also reflected in SAC (Händel, Stephan, Zikuda, Kopp, Bedenlier, and Ziegler 2020). Since the students who receive education in SACs are "special students", the education of these students should not be interrupted. In this process, the cooperation of parents, teachers, and students, which constitute the education pillar, is crucial. It is also thought that it can provide information about the students' evaluation of the education they have received, the determination of their needs, and the quality of the education provided. In addition, it is obvious that the education level of the parents, which is the third component of the education pillar, will create an idea about the education that the students receive.

When the studies on SACs were examined (March, 2020), it was concluded that distance education was not provided in these institutions until the COVID-19 pandemic. However, it is thought that rich content can be given with distance education together with the innovations brought by technology. The present era is called the age of technology, and the perspectives of education based on rote are moving away. Raising individuals with the skills of the 21st century and training these individuals in line with the interests of our country has become an inevitable situation in today's conditions. Tortop (2014) asked the opinions of gifted students about mentoring (EPGBU) in a study he conducted, and gifted students reported positive opinions on this subject. At this point, the issue that should be emphasized is the

preparation of education programs suitable for gifted students, rather than the mentoring training for the university, and the training of these students in line with the interests of the country. As a matter of fact, with the emergence of the COVID-19 epidemic disease, which arose in China towards the end of December 2019 and affected the whole world, the alternatives were sought to meet the educational needs of individuals with the closure of educational institutions. Distance education has taken its place as a savior at this point and has been used effectively by many educational institutions. In this process, it was concluded that the education of SAC students was also disrupted, so these students needed a qualified distance education. In this context, it has been understood that the training for the needs of SAC students can be given by the distance education method. Because the purpose of distance education can be defined as providing education and training opportunities to individuals with systems that can keep up with the developing technology and contribute to human education without being affected by time and space, by eliminating the time and geographical barriers that cause the disruption of education (Kaçan & Gelen, 2020).

It can be asserted that special talented people have problems in accessing these training due to various reasons such as lack of training that interests these learners, and trainers, who will offer training to these special talented learners, transportation problems, and physical disability of the individuals. Some courses at SACs are of interest to gifted students. However, the instructor providing this training may not work full time at SACs. In addition, many reasons such as transportation problems and physical disabilities can cause gifted students to not receive the education they want. Therefore, this study aims to go beyond the existing borders and present an alternative education to gifted individuals through distance education and deliver this training to gifted individuals. In this context, by determining the expectations of gifted students about distance education before and after the application, an alternative way for special students has been produced to reveal whether these training can be given with the distance education method.

Problem of Study

The main problem of this research is stated below. According to this;

- How do the distance education applications/courses implemented in SACs meet the expectations of gifted students and their families?

The sub-problems of this research are;

General talented students who take distance education courses in Kars, Ardahan and Iğdır SACs,

- Is there a significant difference between the pretest-posttest scores of distance education online learning expectations of gifted students?
- Is there a significant difference between the pretest-posttest scores of distance education online learning expectation of gifted students according to the SAC' training program to which they are enrolled?
- Do parents' opinions about distance education differ according to the their education level?
- What are the views of gifted students regarding their distance education experiences?

Methods

Research Design

In this study, explanatory sequential pattern was used from mixed research types in which quantitative and qualitative research designs are used together. The explanatory sequential pattern takes place in two stages. In the first stage, quantitative data is collected and analyzed. Then, qualitative data are collected and analyzed. The researcher interprets the utility of qualitative data in explaining quantitative data in this section (Creswell and Plano Clark, 2014). The one-group pretest-posttest design from quantitative research and case study from qualitative research designs were used. Independent variables are applied to the randomly selected group in the one-group pretest-posttest design. There are both pre-test (pretest) and post application (posttest) measurements in this section. (Karasar, 2002). Case study, on the other hand, is explained as a detailed description of a particular system (Merriam, 2013). In the study, it was quantitatively tested whether there is a significant difference between the distance education online learning expectations and the distance education online learning expectations pretest-posttest scores according to the Science and Art Center. In addition, the differentiation of parents' opinions about distance education according to the parents' education level was

also tested quantitatively. In the qualitative dimension; the opinions of students about their experiences in the course process (in the process) were analyzed. Then, qualitative data obtained were interpreted to explain, control, and support quantitative findings.

Sampling and Study Group

Science and Art Centers (SAC) in Turkey constitute the entire universe of the research. The accessible universe of the research consists of Kars Fahrettin Kırzıoğlu Science and Art Center, Ardahan Science and Art Center and Iğdır Science and Art Center students and parents. The sample was created using the convenience sampling technique, one of the non-random sampling types from this study universe. The sample group of the research was composed of 12 students from Kars Fahrettin Kırzıoğlu Science and Art Center, 13 from Ardahan Science and Art Center, and 15 from Iğdır Science and Art Center, who were educated in basic skills 5th and 6th grades in SACs. 40 students and 40 parents of these students. These students are between the ages of 10-12 and 18 of them are girls and 22 of them are boys. The education level of the parents is five primary school, five secondary school, seven high school graduate, twenty-one university graduate and two postgraduate degree.

Data Collection

Student Online Learning Expectations Form

In accordance with the purpose and sub-objectives of the research, two quantitative and one qualitative data collection research forms were created by the researchers. These forms are; the student online learning expectations form, student self-evaluation form, and parent evaluation form applied to parents. 10 items were developed for the student online learning expectations form, 10 items for the teacher observation form, and 5 items for the parent evaluation form. While creating these forms, first of all, the literature was scanned (Devellis, 2017; Şeker and Gençdoğan, 2006), and information was collected about which steps should be followed while creating the data collection tool and the features that should be considered during the article writing phase. After the information was collected, an item pool was prepared in the light of this information. In this process, the opinions of the Education Programs field expert and the Mathematics education specialist were taken, necessary corrections were made and the form was given its final form. A 17-item draft form was developed for the 10-item distance education online learning expectations form, and an 8-item draft form was developed for the 5-item parent evaluation form. Later, these items were presented to the Education Programs field education specialist and the Mathematics field education specialist, and expert opinion was taken. After the expert opinion, some items were removed and the distance education online learning expectations form was reduced to 10 and the parent evaluation form to 5 items, and these forms were also checked by Turkish language experts (2 language experts), and the forms were finalized. For the student self-evaluation form, 13-item open-ended questions were prepared and 6 of these items were removed after expert opinion (Educational Programs field education specialist and Mathematics field education specialist) and took their final form as an 8-item form. Student online learning expectations and parent evaluation forms; It consists of 5-point Likert-type items such as "strongly agree", "agree", "undecided", "disagree" and "strongly disagree"; The student self-evaluation form, on the other hand, consists of 8 open-ended items. For the student self-evaluation form, a form consisting of 8 open-ended questions was prepared. In line with the purpose of the research, a pilot application was made for the reliability analysis of these draft forms, which were created by taking expert opinion. (Buyukozturk et al, 2008). The developed measurement tools were applied to the students of a secondary school selected as a pilot in the Atakum district, in the Science course, and the data were collected. Within the scope of the pilot application, 106 students participated in the survey and the reliability coefficient (Özdamar, 1999) was calculated with the Cronbach's Alpha. “Student Online Learning Expectations Form” was determined as Cr. α = 0.89. In addition, reliability calculations were made with the real data of the research after the application (for confirmation and cross-checking), and this value was determined as Cr. α = 0.87. The reliability coefficient of the "parent distance education evaluation form" was Cr. α = 0, 86. Based on these analyses, the developed (student translation Online learning expectations form and Parent distance education evaluation form) were found to be highly reliable. To ensure the content validity of the research, opinions were obtained from the experts in the field of Mathematics Education and Curriculum and Instruction, and for the qualitative data collection tool, the percentage of agreement between the science education

specialist and the Curriculum and Instruction science experts was examined. The agreement percentage of the two coders was 81.2%. was detected. The study data were gathered online with the "Google Form" platform.

Procedure

The research was planned in 2019 and the pilot implementation was made in March 2020. However, due to the Covid-19 epidemic disease (pandemic) that emerged in China towards the end of 2019 and affected the whole world, all educational institutions (including SACs) were temporarily closed in March 2020 (in Turkey), and distance education was made. This situation affected the implementation process of the study and therefore the actual implementation of the research could be started in March 2021. In the research, firstly, data collection instruments were created. After the data collection instruments were created, pilot implemantations were made and the reliability calculations of the data collected from the pilot implementation were made. After the reliability calculations of the measurement instruments, the courses to be given by distance education in Science and Art Centers were determined. The selection of the courses to be given by distance education was determined in consultation with the administrators and teachers "In line with the wishes and suggestions of the teachers and administrators", taking into account the needs in Kars, Ardahan and Iğdır SACs. The courses to be taught are; It has been determined as "Astronomy, Thinking Skills, Teaching Mathematics with Origami, Robotic Coding, Intelligence Games and Values Education". In addition, in this process, ethics committee approval was obtained with an official letter from the Social and Human Sciences Ethics Committee of Ondokuz Mayıs University. In addition, necessary permissions were obtained from the Ministry of National Education, General Directorate of Special Education and Guidance Services. In order to determine the problems that may be encountered during the implementation, a course is selected among the determined courses; Distance education and pilot courses were given to Kars, Ardahan and Iğdır SAC students. After the pilot implementation, an implementation plan was prepared for the actual implementation and then the actual implementation was started.

The implementation of the study was done on Sundays and lasted for 4 weeks. After the implementation plan was prepared, a WhatsApp group was created to ensure communication and coordination with the students. Basic skills 5th and 6th grade students, parents and SAC administrators, who were educated in Kars, Ardahan and Iğdır SACs, were included in this group.

In addition, a poster was prepared to promote the study and this poster was shared with the group, giving detailed information about the study, and it was also shared that non-voluntary students could leave the group. At this stage, some students and parents left the group.

After sharing detailed information about the research, pretests were started to be applied and pretest data were collected online. After the pretest data were collected, the practice courses started and the practice courses lasted for 4 weeks. After the practice courses, posttests were also applied and data were collected and the implementation was terminated. In the four-week period:

- In the astronomy course; The stages of stellar life, planets, the formation of the universe, the satellites in the sky, the solar system, and the formation of the world were discussed,
- In the course of teaching mathematics with origami; Triangle, square, rectangle and angles topics were handled,
- In the values education course; The topic of values education in the period of human cultural development was handled,
- In the course of developing thinking skills; Solving extraordinary life problems, decision making, critical thinking and creative thinking are covered.
- In the Intelligence Games lesson; Mangala, Pentamino, Go, Abalone, Quarto games shown
- In the Robotic Coding course; Circuit building on Tinkercad program, burglar alarm system with Arduino, traffic light application, RGB led application and button led burning applications were made.

Screenshots were also taken during the study. Screenshots of the application lessons are presented below.

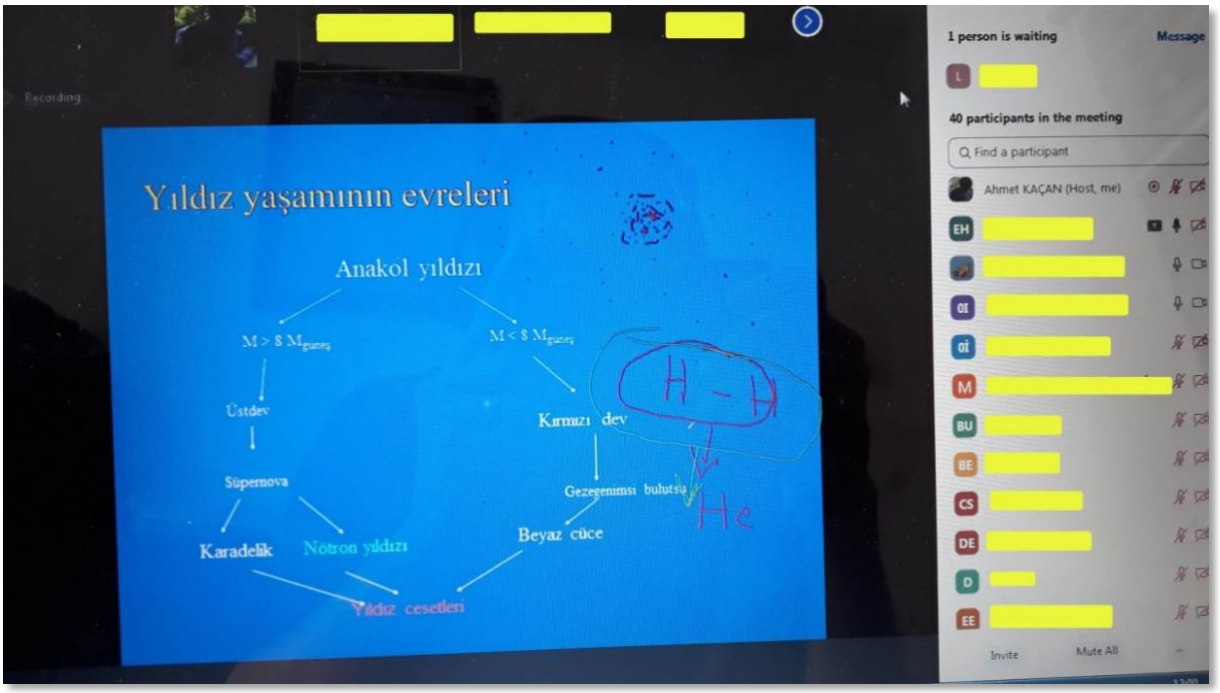

Figure 1. Screenshot of the Astronomy Course

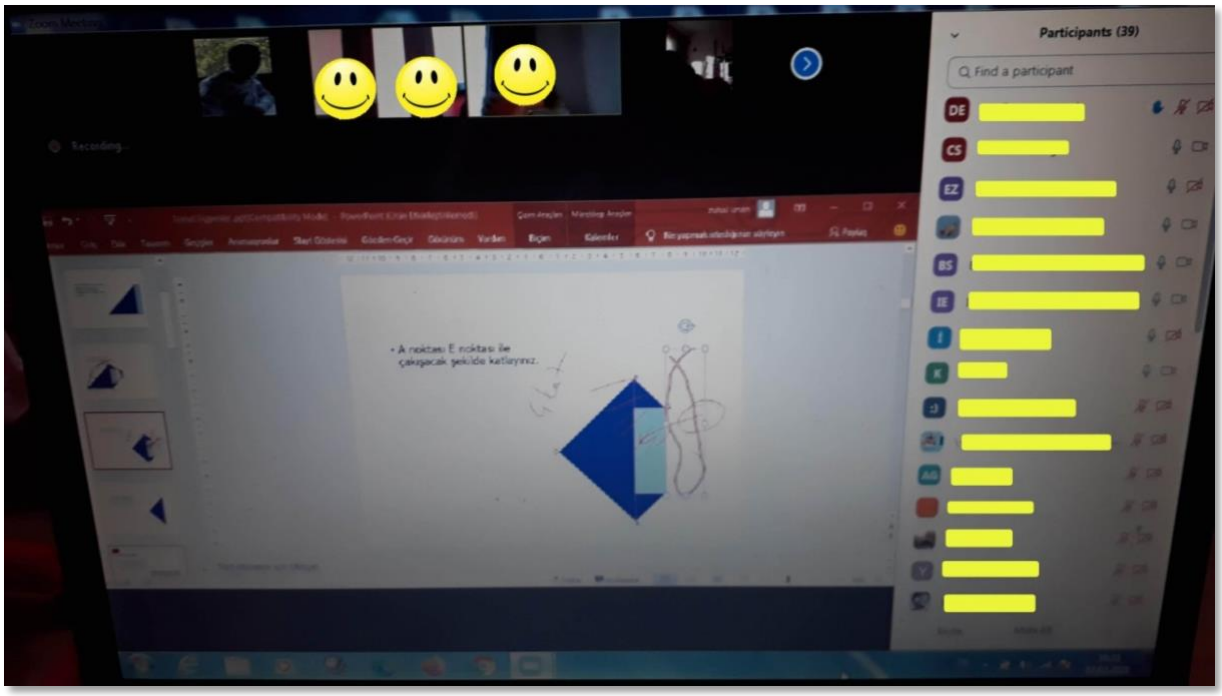

Figure 2. Screenshot of the Origami Lesson

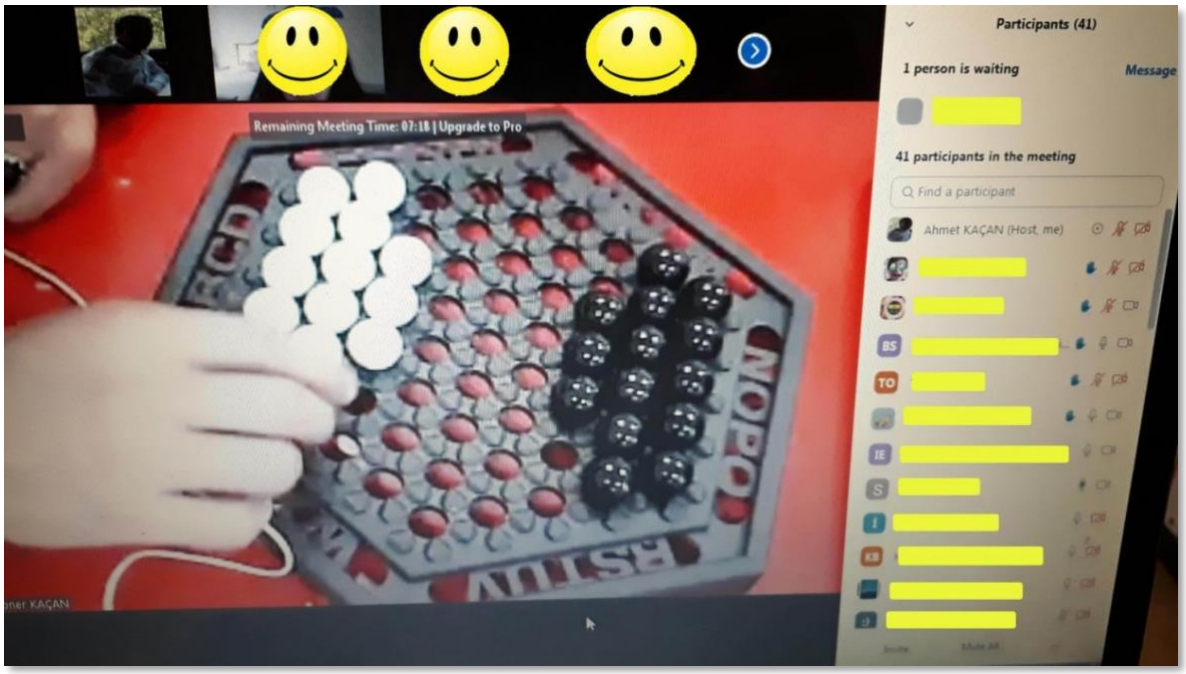

Figure 3. Screenshot of the Intelligence Games Lesson

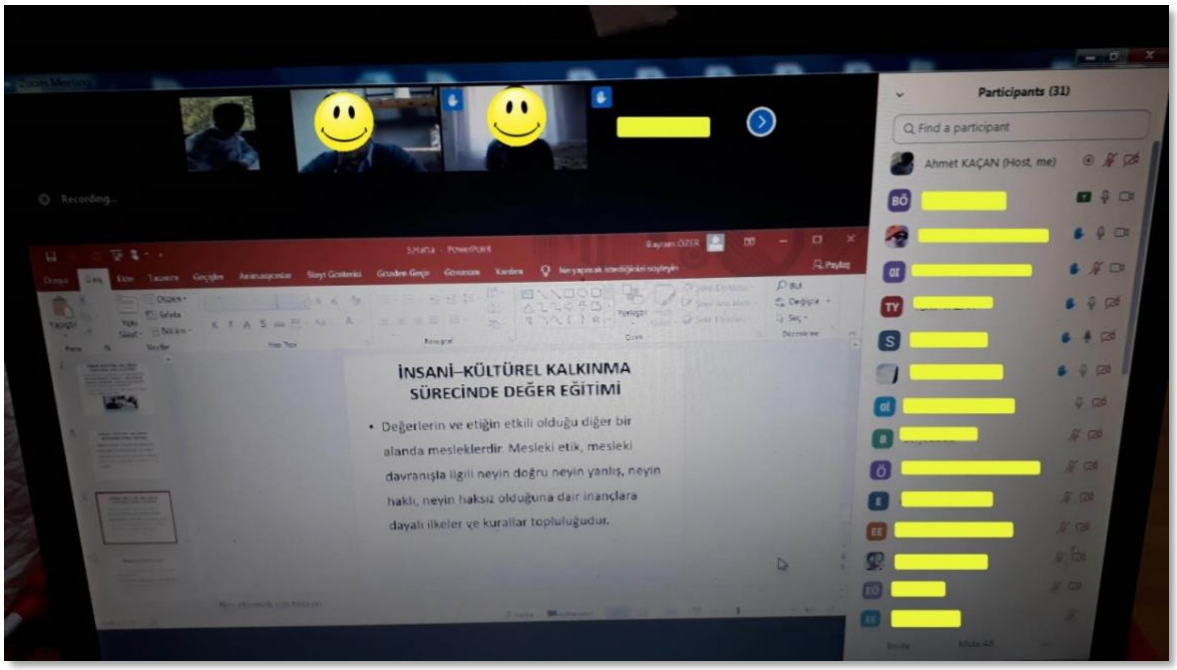

Figure 4. Screenshot of Values Education Lesson

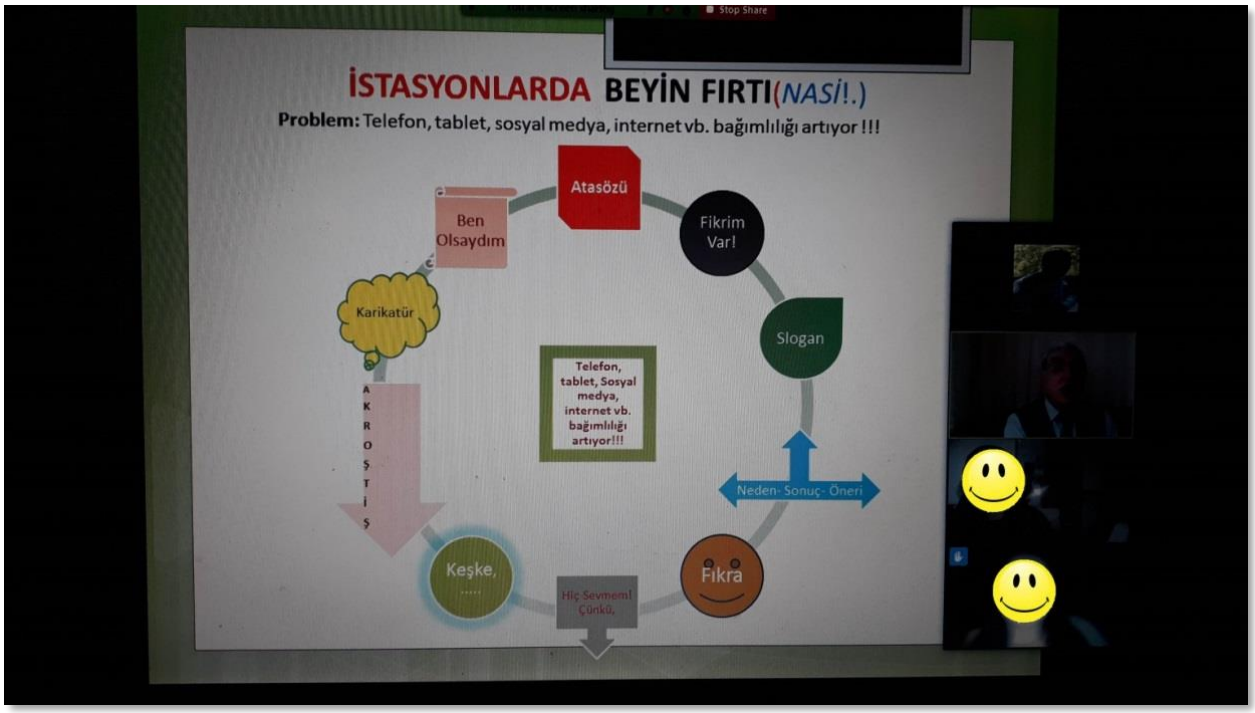

Figure 5. Screenshot of the Thinking Skills Course

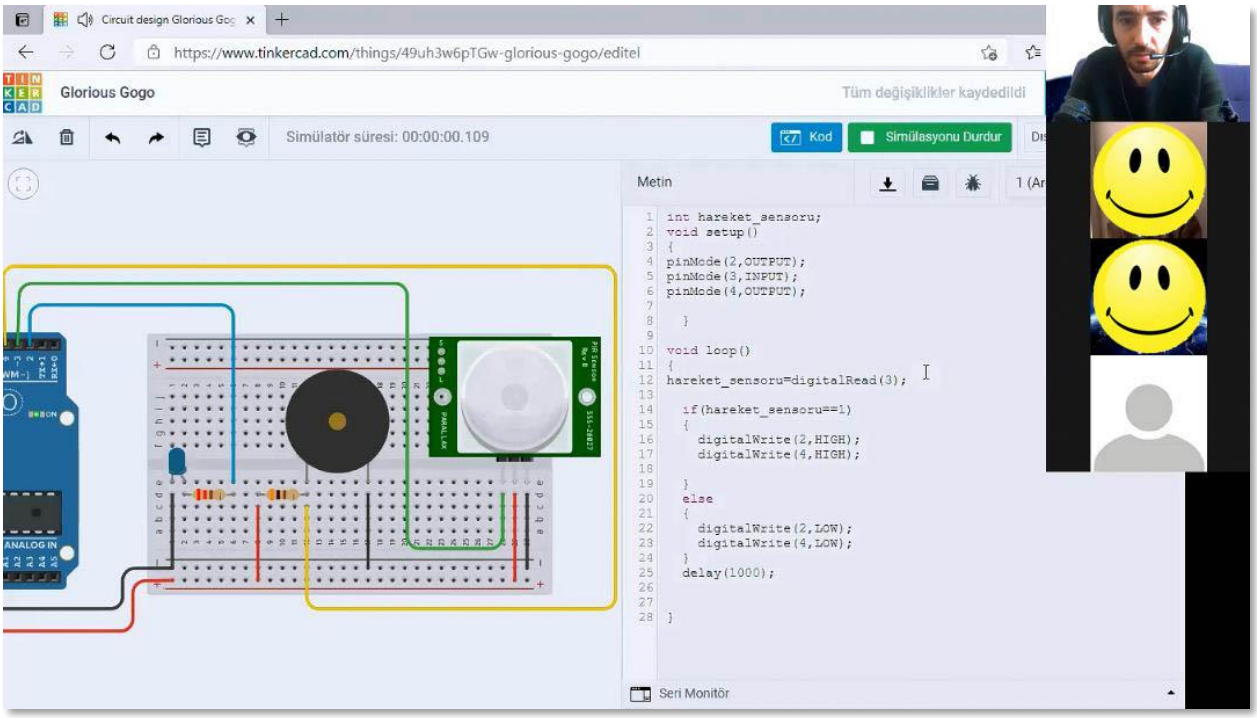

Figure 6. Screenshot of Robotic Coding Course

Data Analysis

As a result of the research, the quantitative data obtained from the measurement tools were analyzed in the SPSS program, and the qualitative data were analyzed in the MAXQDA program. Likert-type student online learning expectations form; The analysis was carried out by giving the values 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Likert type teacher observation form; The analysis was performed by giving the values 1=very poor, 2=poor, 3=moderate, 4=good, and 5=very good.

Concerning to determine the distribution of pretest-posttest scores, normality test was performed, Skewness and Kurtosis values of both measurement tools were calculated and normal distribution conditions were met (George and Mallery, 2010). In the analysis of quantitative data, t-test and analysis of variance (ANOVA), which are parametric test techniques, were performed. The data obtained from the student self-evaluation form, which constitutes the qualitative

part of the research, was tried to be analyzed with the coding in the MAXQDA program. Qualitative research data obtained in content analysis; It includes stages such as coding the data, finding the themes, organizing and interpreting the codes-themes (Yıldırım & Şimşek, 2016). In the data obtained from the student self-evaluation form, the percentage of agreement of the two coders was examined. According to Kabapınar (2003), a consistency of 80% and above between two coders, and a consistency of 70% and above between two coders according to Miles and Huberman, shows that the data analyzes are reliable (as cited in Türnüklü, 2000). The percentage of agreement obtained for this study was determined as 82.05%, which indicates that the research data analyzes provide a high level of agreement reliability between raters.

Findings and Discussion

In this section, the findings obtained as a result of the research are given.

Is there a significant difference between the pretest-posttest scores of distance education online learning expectations of SAC students' ? Findings related to the sub-problem

In order to determine the distribution of pretest-posttest scores, data set normality test conditions (Skewness Kurtosis value test) was performed and parametric test conditions were provided. Then, paired samples t-test was conducted to test whether there was a significant difference between the pretest-posttest scores of the distance education online learning expectations of SAC students.

Table 1. Paired Samples T-Test Analysis Between the Pretest-Posttest Scores of the Students

Test	N	$\bar{X}$	ss	df	t	p
Pretest	40	24	5,64324	39	-12,745	0,00
Posttest	40	37,125	5,32622			

Considering the findings obtained as a result of the first sub-problem of the research, distance education online learning expectations pretest score arithmetic mean value $\bar{X}$=24; The arithmatic mean of distance education online learning expectations posttest scores was found to be $\bar{X}$=37,125. Paired groups t-test analysis was performed to determine whether there was a significant difference between pretest-posttest scores and it was determined that students' online learning expectations showed a significant difference (p=.000) in favor of their posttest scores. It is thought that the increase in the average and the decrease in the standard deviation after the application, the students get closer to each other (positively), which means that the education given to the students have a positive effect on the students. According to this information, when the pre-application and post-application data of the students in the distance education online learning expectations form items are examined, it can be interpreted that their thoughts have changed positively after the application.

Gifted Students' Online Learning Expectations

The findings related to this sub-problem are shown in the tables below.

Table 2. Descriptive Statistics about the Students' Scores on Online Learning Expectations By SAC Where They Received Training

	N	$\bar{X}$	ss
Kars SAC	12	11,0000	5,30866
Ardahan SAC	13	16,6154	6,27878
Iğdır SAC	15	11,8000	6,72097
Total	40	13,1250	6,51305

When the group statistics shown in Table 2 were examined, it was determined that 12, 13, and 15 students participated in the study from Kars, Ardahan, and Igdır SACs (Science and Arts Centers), respectively and the mean scores were 11 among the students from Kars, 16.61 among the students from Ardahan, and 11.80 among the students from Iğdır while the standard deviations were found to be 5.30 for the scores of the students from Kars, 6.27 for the scores of the students from Ardahan, and 6.72 for the scores of the students from Iğdır.

The Levene test statistics conducted for testing the homogeneity distribution of the data showed that the data obtained from the student questionnaires had an equal variance, namely, were homogeneously distributed by SAC they received training (p>.05). Therefore, the ANOVA analysis was performed.

Table 3. ANOVA Findings Regarding the Students' Scores on Online Learning Expectations by SAC Where They Received Training

	Sum of Squares	df	Mean of Squares	f	p	Source of Difference
Inter-groups	238,898	2	119,449	3,122	0,05	1-Kars SAC-2-Ardahan SAC
Intra-group	1415,477	37	38,256			
Total	1654,375	39				

According to the data in Table 3, as a result of the ANOVA analysis performed for determining whether there is a statistically significant difference between the pre-test and post-test mean scores of the students by SAC they received training, the significance value between the pre-test and post-test scores was calculated to be p=.05, which shows that there is a significant difference. To determine between which SACs this difference is significant, a Post Hoc test was conducted and the findings are shown in the table below.

Table 4. Post Hoc Test of the Pre-Test and Post-Test Scores on Online Learning Expectations by SAC Where They Received Training

	Kars SAC	Ardahan SAC	Iğdır SAC
Kars SAC	-	*p=0.029	-
Ardahan SAC	*p=0.029	-	*p=0.047
Iğdır SAC	-	*p=0.047	-

In the light of the analysis of the data in Table 4, the significance value between Kars SAC and Ardahan SAC was found to be p=.026, and it was found p=.047 between Ardahan SAC and Iğdır SAC. As the significance values are less than .05, there is a statistically significant difference between the online learning expectations pre-test and post-test scores of the students.

When the findings related to the "SAC where the students received training", the difference between the pre-test and post-test scores on online learning expectations of students in distance education was found to be significant between Kars SAC and Ardahan SAC; and between Ardahan SAC and Iğdır SAC. According to this finding, it can be interpreted that students' expectations can change by the SAC where they received training.

Gifted Students' Family Education Level & Distance Learning

The findings related to the sub-problem of "Do SAC students' parents' opinions differ by the education level of parents (1-Primary school, 2-Secondary school, 3-High school, 4- University, and 5-Post-graduate)?" are given below.

Table 5. ANOVA Test Findings by the Education Level of Parents

		Sum of Squares	sd	Mean of Squares	F	p	Source of difference
I want my child to receive the training that he/she needs (but not provided in SAC where he/she is studying) through distance education	Inter-groups	10,408	4	2,602	3,080	,028	1-2, 1-4, 3-4, 3-5
	Intra-group	29,567	35	,845			
	Total	39,975	39				
I want my child to be trained by teachers from other SACs through distance education.	Inter-groups	7,975	4	1,994	1,836	,144	2-4
	Intra-group	38,000	35	1,086			
	Total	45,975	39				

I want my child to be trained by academicians from universities through distance education.	Inter-groups	1,576	4	,394	1,147	,351
	Intra-group	12,024	35	,344		
	Total	13,600	39			
I think that distance education will answer my child's educational needs.	Inter-groups	5,580	4	1,395	,665	,620
	Intra-group	73,395	35	2,097		
	Total	78,975	39			
I think that distance education is an appropriate alternative for the training my child may need.	Inter-groups	3,894	4	,974	,680	,610
	Intra-group	50,081	35	1,431		
	Total	53,975	39			

When the data in Table 5 were examined to find out whether the parents' opinions differ by their education level, in the item "I want my child to receive the training that he/she needs (but not provided in SAC where he/she is studying) through distance education.", it was seen the scores of parents with primary school level differ significantly from the scores of the parents with high school and university level of education and the scores of those with a post-graduate level of education differ significantly from the scores of those with a high school level of education. To determine between which education levels this difference is significant, a Post Hoc test was conducted and the findings are shown in the table below.

Table 6. The Post-Hoc Analysis Demonstrating the Source of Difference in the Item "I Want My Child To Receive The Training That He/She Needs (But Not Provided in SAC Where He/She is Studying) Through Distance Education" By The Education Levels Of Parents

	Primary School	**Secondary School**	**High School**	**University**	**Post-graduate**
Primary School	-	*p=,046	-	*p=,012	-
Secondary School	*p=,046	-	-	-	-
High School	-	-	-	*p=,013	-
University	*p=,012	-	-	-	-
Post-graduate	-	-	*p=,013	-	-

According to the crosstabulation, the p values of the first item were found to be *p<=.046, p<=.012, and p<=.013. As a result of the analysis of the data about the first item, the significance values were p<.05 for the paired education levels of primary-secondary school, primary school-university, and high school-university. The value of p<.05 indicates a statistically significant difference between these groups. To see at which education levels the differences regarding the first item are more significant (in favor of which education level), the descriptive statistics table was referred to and the findings are as follows:

Table 7. Descriptive Statistics on Whether Parents' Opinions Differ by Their Education Level

		N	$\bar{X}$	**ss**
I want my child to receive the training that he/she needs (but not provided in SAC where he/she is studying) through distance education	**Primary school**	5	2,60	1,517
	Secondary school	5	1,40	,548
	High school	7	2,43	1,512
	University	21	1,38	,498
	Post-graduate	2	1,50	,707
	Total	40	1,73	1,012

The data were analyzed to determine whether parents' opinions differ by their education level and it was seen that parents' mean scores for the first item by their education level were $\bar{X}$=2.60 for the primary school level, $\bar{X}$=1,40 for the secondary school level, $\bar{X}$=2,43 for the high school level, $\bar{X}$=1,38 for the university level, and $\bar{X}$=1,50 for the post-graduate level.

Table 8. The Post Hoc Analysis Displaying the Source of Difference in the Item "I Want My Child To Be Trained by Teachers From Other SACs Through Distance Education." by the Education Level of Parents

	1-Primary School	2-Secondary School	3-High School	4-University	5-Post-graduate
Primary school	-	-	-	-	-
Secondary school	-	-	-	*p=.030	-
High school	-	-	-	-	-
University	-	*p=.030	-	-	-
Post-graduate	-	-	-	-	-

According to the crosstabulation, the p values found based on the education levels of parents were *p<=.030. The significance level for the second item was determined to be less than .05 in the paired education level of secondary school - university. The p-value less than .05 indicates a statistically significant difference. To see at which education levels the differences regarding the second item are more significant (in favor of which education level), the descriptive statistics table was referred to and the findings are as follows:

Table 9. Descriptive Statistics on Parents' Opinions by Their Education Level

		N	$\bar{X}$	ss
I want my child to be trained by teachers from other SACs through distance education	**Primary school**	5	1,80	,447
	Secondary school	5	2,60	1,817
	High school	7	2,14	1,574
	University	21	1,43	,676
	Post-graduate	2	1,00	,000
	Total	40	1,73	1,086

It was seen that parents' mean scores for the second item by their education level were $\bar{X}$=1.80 for the primary school level, $\bar{X}$=2.60 for the secondary school level, $\bar{X}$=2.14 for the high school level, $\bar{X}$=1.43 for the university level, and $\bar{X}$=1.00 for the post-graduate level.

The findings related to the third sub-problem of the study were examined to find out whether parents' opinions differ by their education level. When the first item "I want my child to receive the training that he/she needs (but not provided in SAC where he/she is studying) through distance education" was examined, it was seen that the scores of parents with a primary school level of education differed significantly from the scores of those with a secondary school and a university level of education, the scores of those with a high school level of education differed significantly from the scores of those with a university degree, and the scores of those with a post-graduate degree from the scores of those with a high school degree. Briefly, for the first item, it can be interpreted that significant differences were seen between the paired education levels of primary school-secondary school, university-primary school, and postgraduate-high school. For the second item "I want my child to be trained by teachers from other SACs through distance education." a significant difference was seen between secondary school and university levels of education. Based on these findings, it can be said that parents' education level can be a determinant of their opinions.

Opinions about Distance Learning Experience

Findings related to the sub-problem of "What are SAC students' opinions about their experiences in the course process?" are given below:

Table 10. Content Analysis of the Opinions of Gifted Students about the Opinions about Distance Learning Experience

Theme	Codes	Students	Frequency (f)	Percentage (%)
Opinions about Distance Learning Experience	**Useful**	s1,s4, s12 s16,s19,s22,s23, s27,s31,s34, s35,s36,s39	13	32,5
	Being useful face-to-face	s5,s8,s9,s13,s18, s24,s25,s26,s30,s38	10	25
	Unuseful	s17,s20,s21,s29,s32, s33	6	15
	Acquired new knowledge	s2,s3,s14,s28,s40	5	12,5
	Education in different fields	s7,s10,s11,s31	4	10

When Table 10 about the first item was examined, it was seen that 32.5% of the students found distance education useful, 25% found being useful face-to-face, 15% found distance education unuseful, 12.5% said that it acquired new knowledge, and 10% said that they received education in different fields.

In the light of these data, these percentages can indicate that the training given through distance education was useful and the high number of students who said that it provided new information in different fields can be interpreted that the training provided through distance education was found useful by the students. In a study by Leontyeva (2018), a scale was applied to determine the students' attitudes towards distance education, and they were asked whether they liked using online courses or not. 90% of the participants responded positively by expressing that they can learn the subjects whenever they want. Moreover, 95.6% of them, almost all, evaluated the efficacy of e-courses positively. In a meta-analysis study conducted, Nguyen (2015) reported that 92% of the distance education and online education studies revealed that distance learning and online learning were found to be an efficient type of learning, though not being as efficient as the traditional face-to-face learning and 3% of the studies revealed that face to face education was found more effective, and 4% of the studies revealed mixed findings.

Taking the Desired Course with Distance Education

Table 11. Content Analysis of the Opinions of Gifted Students about the Taking the Desired Course with Distance Education

Theme	Codes	Students	f	%
Taking the Desired Course with Distance Education	Positive	s1,s2,s4,s7,s8, s10,s11,s14, s19,s22,s23, s24,s26,s27,s28,s30, s31,s32, s34,s35,s40	21	52,5
	Face-to-face preference	s5,s12,s13,s18,s20, s21,s25, s33, s39	9	22,5
	Taking all courses	s3,s6,s16,s37	4	10
	Independence of venue	s17,s36	2	5
	Cannot be taken	s29,s38	2	5

When Table 11 was examined, it was seen that what do you think about the chance of receiving through distance education the training that you wanted but could not get? Responded that it 52.5% of the students positive, 22.5% responded that they could face-to-face preference, 10% responded that taking all courses, 5% responded that independence of venue and 5% responded that courses cannot be taken. In the light of these data, it can be interpreted that students were highly willing to take some courses through distance education and also that every course can be taken from everywhere through distance education. Besides, it can be said that some of the students have not internalized distance education yet.

Learned from Distance Education Implementation

Table 12. Content Analysis of the Opinions of Gifted Students about the Learned from Distance Education Implementation

Theme	Codes	Students	f	%
Learned from Distance Education Implementation	Astronomy	s2,s3,s5,s6,s11, s23,s26,s28,s37, s38,s39	11	27,5
	Acquiring new knowledge	s1,s7,s10,s14,s16, s21,s25,s29,s40	9	22,5
	Learning Thinking Skills	s2,s4,s5,s11,s15, s22,s26,s28	8	20
	Learning to code and build circuits	s3,s6,s9,s11,s23, s26,s28,s34	8	20
	Learning brain teasers	s2,s3,s6,s9,s37,s39	6	15
	Learning additional information	s13,s17,s19,s30,s32	5	12,5
	Math with Origami	s3,s9,s23	3	7,5

When Table 12 is analysed, "What kind of information have you learnt from these training you received through distance education process? ", 27.5% of the students answered that they Astronomy; 22.5% acquiring new knowledge; 20% learning to code and build circuits; 20% Learning Thinking Skills; 15% learning brain teasers; 12.5% learning additional information and 7.5% Math with Origami. Within this information, it can be interpreted that the majority of the students learnt new and different information in Astronomy, Robotic Coding and Thinking Skills courses. In addition, while it can be interpreted that they acquired new and different information at the same rate in the Robotic Coding and Thinking Skills courses, it can be interpreted that a small number of students acquired new and different information in Origami and Mathematics courses. This situation can be interpreted as the students could not get used to learning Mathematics with Origami. In general, it can be stated that students learnt new information from the education they received.

Opportunity to Take Lessons with Distance Education

Table 13. Content Analysis of the Opinions of Gifted Students about the Opportunity to Take Lessons with Distance Education

	Codes	Students	f	%
Opportunity to Take Lessons with Distance Education	Receiving education from different SAC	s1, s2, s4,s5,s6, s7,s8,s10,s14, s17,s20, s21,s22, s23,s24,s26,s28,s30,s31,s32,s33, s34, s39,s40	24	60
	Receiving different training	s3,s11,s16,s19,s35, s36,s37	7	17,5
	Face to face preference	s12,s13,s18,s25, s27,s38	6	15

When Table 13 is examined, "What do you think about being able to receive a training you need (a training that is not available in your own SAC) through distance education if the opportunity is offered?" 60% receiving education from different SAC; 17.5% said that Receiving different training and 15% said receive face-to-face. Within this information, it can be interpreted that students are very willing to receive training that is not available in their own SACs through distance education and that different pieces of training can be received through distance education.

Distance Education or Face to Face Education Preference

Table 14. Content Analysis of the Opinions of Gifted Students about the Distance Education or Face to Face Education Preference

Theme	Codes	Students	f	%
Distance Education or Face to Face Education Preference	Face to face preference	s1,s2,s4,s5,s6, s7,s8,s9,s10,s11,s12,s13,s14,s15,s16, s17,s18,s19,s20,s21, s22,s23,s24,s25,s26, s27, s28, s29,s30,s31, s32,s33,s34,s35,s37, s38,s39,s40	38	95
	Remote preference	s3,s36	2	5

When Table 14 is examined, "If you want to take these pieces of training that you have received through the distance education process again, would you prefer to take them with distance education or normal (face-to-face) education?" 95% of the students answered face-to-face, while 5% answered that they remote preference. Within this information, it can be interpreted that the courses given by distance education would be more useful if they were given face-to-face. It is thought that the COVID-19 pandemic and its reflections on the education process have a great impact on this result.

In Yadigar's (2010) study on "evaluation of the effectiveness of distance education programmes", students were asked which type of programme they would prefer if they wanted to receive another education in the future, and the majority of students stated that they would prefer a distance education programme if they wanted to receive another education in the future.

Recommendations for the Efficiency of Distance Education

Table 15. Content Analysis of the Opinions of Gifted Students about the Recommendations for the Efficiency of Distance Education

	Codes	Students	f	%
Recommendations for the Efficiency of Distance Education	Extension of the duration	s1,s4,s5,s6,s16, s19,s21,s28,s37	9	22,5
	Internet and technical problem solving	s12,s14,s25,s33, s36, s38,s40	7	17,5
	More activities	s3,s8,s9,s30,s34,	5	12,5
	Private platform (such as EBA)	s13,s17,s32	3	7,5

When Table 15 is analysed, to the question "What do you think can be done to make distance education courses more efficient?", 22,5% of the students answered extension of the duration; 17,5% answered that internet and technical problem solving; 12,5% answered that more activities and 7,5% she replied that a special platform such as the Education Information Network (EBA) can be created. Within this information, it can be interpreted that the majority of the students complain about the limited duration of the courses and the technical problems experienced especially in distance education. Again, it can be interpreted that students want to do more activities with distance education by establishing a special platform. If course durations are extended and activities can be diversified, it can be stated that students' perspectives towards distance education may be different. Especially with the compulsory transition to distance education after the Covid-19 pandemic, it can be interpreted that in the first stage, students had connection problems in the process of getting used to distance education, they spent some of their time connecting to the system due to the limited course duration, and this was reflected in the students' responses.

Although there were no technical problems during the application, the fact that the students mentioned technical problems can be interpreted that they reflected the problems they experienced in distance education outside our application to the study. In a study conducted by Satıcı et al. (2020), students complained that there was not enough time in the coding sections due to the insufficient course hours (60 minutes for all courses) in the programming course conducted by distance education. In a study conducted by Salman et al. (2021), it was concluded that the average difficulties encountered by students in distance education were high and that technical problems in the internet and distance education platforms made students uneasy. Veletsianos et al. (2021) concluded that the time commitments required for students to be successful in distance education courses should be prepared according to realistic understandings. Delcker and Ifenthaler (2020), in their study, concluded that the information technology infrastructure in many schools did not work, and the existing technological equipment is not suitable for distance education. Handel et al. (2020) revealed in their studies that students who were not ready for online distance education had to deal with two kinds of problems. The first was the lack of equipment to participate in online distance education, and the second was that they suffered from stress-related emotions and loneliness.

Advantages of Distance Education

Table 16. Content Analysis of the Opinions of Gifted Students about the Advantages of Distance Education

Theme	Codes	Students	f	%
Advantages of Distance Education	No advantage	s1,s2,s6,s11,s12, s18,s25,s28,s31	9	22,5
	Independence of time and space	s3,s4,s7,s13,s17, s24,s36,s39,s40	9	22,5
	Health	s14,s15,s21,s30,s33	5	12,5
	Freedom to choose education	s10,s16,s26,s32	4	10

In Table 16, "What are the advantages of distance education compared to face-to-face education?" 22.5% of the students answer the question independence of time and space; 12.5% health; 10% freedom to choose education; 22.5% answer that there is no advantage. Within this information, while most students find it advantageous in terms of time and place independence, health and getting the education they want, it can be interpreted that some do not see distance education as beneficial. Since the application was made during the COVID-19 pandemic, which emerged at the end of 2019 and affected the whole world, it can be interpreted that students consider distance education advantageous as an escape from the COVID-19 pandemic. In addition, it can be stated that the risk of transmission of the COVID-19 pandemic is high; students care about their health and see distance education as an advantage to stay away from the pandemic. In their study, Ewing and Cooper (2021) concluded that most students found distance online learning less personalized and quite challenging. Erümit (2020), on the other hand, stated in his study that students' views on simultaneous remote lessons were largely positive as they provided advantages such as social interactions, motivation and asking questions. In Leontyeva's (2018) study, students emphasized both advantages and disadvantages in the quality of distance education: 85.14% of students stated the existence of distance education as an advantage, and any electronic course could be learned anywhere with any electronic device with the internet access. Furthermore, almost all participants drew attention to the opportunity to improve themselves (89.7%) and save their spare time (80.9%). In addition, 57.01% of the participants stated that their anxiety decreased while performing control tasks (e.g., tests, credit tests), and the main shortcomings (disadvantages) of distance education were the lack of full-fledged communication with teachers and other students (about 44%), the lack of necessary skills to use computer-based online learning systems (57.9%), and parents' critical attitude towards such activities (39,7%). In their study, Lee et al. (2021) concluded that technology-related problems decreased rapidly after obtaining initial access and adaptation to online learning environments. Moreover, most students highlighted that they found online learning accessible (no technical and internet problems) positive and commented as follows: "I had the opportunity to access it from anywhere there was the internet, and it was quite productive"; "it was very convenient that I could arrange my learning time"; and "I really preferred the online course, I had a chance to watch the course and the videos multiple times whenever I wanted."

Disadvantages of Distance Education

Table 17. Content Analysis of the Opinions of Gifted Students about the Disdvantages of Distance Education

Theme	Codes	Students	f	%
Disadvantages of Distance Education	Connection difficulty	s3,s7,s9,s12,s13, s16,s19,s20,s21,s28,s32,s38	12	30
	Causing health problems	s14,s31,s33,s39	4	10
	Inefficient	s11,s26,s35,s40	4	10
	Difficulty of mutual communication	s18,s24,s37	3	7,5

As represented in Table 17, "What are the disadvantages of distance education compared to face-to-face education?" 30% of students connection difficulty; 10% highlighted that causing health problems; 10% emphasized its inefficiency, and 7.5% answered that difficulty of mutual communication. Within this information, it can be interpreted that most students have difficulties accessing and communicating in distance education and complain about various health problems. In addition, the impact of the COVID-19 pandemic has crucial effects on students in seeing distance

education as a disadvantage as it causes health problems and as an advantage for escaping from the COVID-19 pandemic. Students see distance education as a disadvantage because it causes health problems such as being in front of the screen for a long time, muscle stiffness, eye discomfort and joint pain; hence, it can be indicated that they see distance education as an advantage to escape from the COVID-19 pandemic and stay away from the pandemic. Lee et al. (2021) concluded in a study that one of the negative aspects of distance online learning was the lack of peer-to-peer interaction (socialization). In addition, students stated that it was difficult to "communicate with other students" and "make new friends". Ewing et al. (2021) revealed in their study that social isolation was a great challenge for students.

Conclusion

With the COVID-19 pandemic, the concept of distance education has started to be heard frequently, and it has been realized how vital it is. In this study, carried out with gifted students in SACs through distance education, it was thought that awareness of distance education would be created in SACs. The research findings were discussed from the perspective of students and parents, and the results are given below.

Before the research, the distance education online learning expectations form was applied to the students, and their views on distance education were taken. After the application, the same form was applied again, and it was concluded that the students' views changed positively after the training.

With the same form, the students' views were also taken based on their education in SAC, and their achievement scores were examined after the application. It was concluded that there was a significant difference in their opinions.

In the form in which the researchers analyzed whether the parents' views differed significantly or not according to their education level, it was concluded that the parents' opinions differed significantly in some items and did not differ in others. For the item "I would like my child to receive the education they need, which is not in Science and Art Center through distance education," significant differences were found between secondary school and primary school; university and primary school; university and high school. For the item "I would like my child to take lessons from teachers in different SACs through distance education," it was concluded that there was a significant difference between university and secondary school.

In the form in which students' opinions were taken after the teaching practices, they were asked whether the training they received through the distance education process was beneficial or not. It was concluded that the training was beneficial, and the students learned new information about various fields.

Students who were asked about their opinions about taking the courses they did not take due to various reasons such as not being available in their SACs, transportation problems, physical disability of the individual through distance education. It was concluded that they were very willing to take some courses through distance education and thought every class could be handled this way. However, it was concluded that some students did not get used to distance education. Students were also asked about their opinions on taking the courses they needed that were unavailable in their SAC through distance education if the opportunity was offered again. It was concluded that most of the students were willing to take them.

Students were asked whether they would like face-to-face education or distance education if they wanted to take these courses that they took through distance education again. It was concluded that the majority of the students would prefer face-to-face teaching. At this point, it was understood from the contradiction that the COVID-19 pandemic and all its reflections on education affected the students' answers.

It was concluded that most of the students who were asked opinions about how to make distance education more efficient complained about the short duration of the lessons and the technical problems experienced during the lessons.

It was concluded that most of the students, who were asked about the advantages and disadvantages of distance education, found distance education advantageous in protecting their health (escaping from the COVID-19), taking the courses they wanted and being independent of time and space. However, some students thought otherwise. It was concluded that most students had difficulties accessing and communicating in distance education, and some had health problems like eye and muscle pain. When these results were examined, it was thought that current issues related to

distance education were under the effect of the COVID-19 pandemic since students actually did not experience any communication and access problems during the practices.

In this study, Astronomy, Thinking Skills, Origami and Mathematic, Values Education, Robotic Coding and Intelligence Games courses were taken by the students who were studying at Science and Art Centers in Kars and Ardahan. At the end of the teaching practices, the opinions of students and parents about the courses were tried to be interpreted. As the internet is taking a prominent place in our lives, a new era has started in distance education. Many public institutions and private sectors in the education sector have begun to provide distance courses. In this way, the concept of time and place in education has disappeared, and individuals have been given the opportunity to receive these courses wherever and whenever they want. Since distance education has become widespread today, institutions and organizations will support lifelong learning while creating content if they develop programs aimed at meeting the interests and needs of individuals and the skills required by the age. It is essential for the future of our country that the gifted students who receive education in SACs reach the educational outcome they need. It is necessary to meet the needs of gifted students in SACs with courses covering the skills required by the age to prevent the talents of these individuals from atrophying, and it is thought that distance education can be an alternative for the solution to this problem. So, they can take the courses they need from the academicians at universities and teachers in SACs. The importance of distance education has emerged with the effects of the Covid-19 pandemic and its aftermath, and this process has revealed the necessity of giving more place to distance education qualitatively and quantitatively. In the digitalized world, it is obvious that distance education will not be temporary and will take more place in our lives, and in this context, it is thought that particular importance should be given to distance education in SACs.

Recommendations

- In other studies, more in-depth research on distance education can be conducted by taking the opinions of teachers working in SACs.
- It is suggested that by doing a similar study in other SACs, the observations of the teachers who teach with distance education about their students can be analyzed.
- It is suggested that since the results of this study were under the effect of the Covid-19 pandemic, a similar study can be repeated in the future and the results can be reinterpreted.
- It is suggested that the results of a similar study can be evaluated by conducting the analysis on different courses in other SACs.
- The results of this study were obtained by interpreting the data obtained from gifted students in SACs, and a similar study can be conducted with specially gifted students in SACs and the results can be interpreted.
- It is suggested that training can be given by creating special platforms (such as EBA) in studies to be carried out with distance education and the results can be evaluated.
- In other studies, research can be conducted on what kind of advantages distance education has in terms of health.

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Appendix 1.

Distance Education Online Learning Expectations Form

Distance Education Online Learning Expectations Form

Dear students, This form has been developed for scientific research and the opinions you express in the form will only be used for scientific research and your answers will not be shared with anyone in secret. It is important for our research that you sincerely answer the items in the form and give your real opinions. Read each item carefully and select the option that suits you best. Please take care to answer all items. Thank you very much for your contributions to the research.

Type of school studied
☐ Public school
☐ Private school

BILSEM where training is taken
☐ KARS / CENTER - Fahrettin Kırzıoğlu Science and Art Center
☐ ARDAHAN / CENTER - Ardahan Science and Art Center
☐ IĞDIR / CENTER - Iğdır Science and Art Center

Gender
☐ Girls ☐Boys

Age
☐ 10 ☐11 ☐12

Item No.	Distance Education Online Learning Expectations Form Items	I Strongly Agree	Agree	I'm undecided	Disagree	I strongly disagree
1	I prefer distance learning to face-to-face					
2	I would like to receive some trainings that I want to receive but cannot get with distance education.					
3	I think distance education is useful					
4	I think I will learn better with distance education					
5	I think distance education will increase my success in my courses					
6	I think that distance education will offer equal education opportunities to everyone.					
7	If I take my classes by distance learning, I feel much more comfortable (there is no pressure on me)					
8	Distance learning allows me to express myself better in classes					
9	I think distance education is a suitable alternative for the trainings I need.					
10	I think distance education is more effective than face-to-face education					

Appendix 2. Distance Education Self-Assessment Form

Distance Education Self-Assessment Form
Dear students, This form has been developed for scientific research and the opinions you express in the form will only be used for scientific research and your answers will not be shared with anyone in secret. It is important for our research that you sincerely answer the items in the form and give your real opinions. Read each item carefully and select the option that suits you best. Please take care to answer all items. Thank you very much for your contributions to the research.
Type of school studied ☐ Public school ☐ Private school
BILSEM where training is taken ☐ KARS / CENTER - Fahrettin Kırzıoğlu Science and Art Center ☐ ARDAHAN / CENTER - Ardahan Science and Art Center ☐ IĞDIR / CENTER - Iğdır Science and Art Center
Gender ☐ Girls ☐Boys
Age ☐ 10 ☐11 ☐12
Class ☐ 5th class ☐ 6th grade
Distance Education Self-Assessment Form Items Important Note: When answering the articles, only answer by considering the lessons you have learned within this scientific research.
1) What do you think about the usefulness of these trainings you have received through the distance education process?
2) What do you think about the possibility of receiving an education that you want to receive but cannot get with distance education?
3) What kind of information did you learn from these trainings you received through the distance education process?
4) If you are given the opportunity, what do you think about being able to receive an education you need (an education that is not in your own BILSEM) with distance education?
5) If you want to take these trainings you have received through the distance education process again, would you prefer to take them with distance education or normal (face-to-face) education?
6) What do you think can be done to make the courses given by distance education more efficient?
7) In your opinion, what are the advantages of distance education compared to face-to-face education?
8) In your opinion, what are the disadvantages of distance education compared to face-to-face education?

Appendix 3. Distance Education Parent Evaluation Form

Distance Education Parent Evaluation Form

Dear parents, This form has been developed for scientific research and the opinions you express in the form will only be used for scientific research and your answers will not be shared with anyone in secret. It is important for our research that you sincerely answer the items in the form and give your real opinions. Read each item carefully and select the option that suits you best. Please take care to answer all items. Thank you very much for your contributions to the research.

BİLSEM where the student is trained
☐ KARS / CENTER - Fahrettin Kırzıoğlu Science and Art Center
☐ ARDAHAN / CENTER - Ardahan Science and Art Center
☐ IĞDIR / CENTER - Iğdır Science and Art Center

Gender
☐ Mrs. ☐Miss

Your Age
☐ 25 and under ☐ 26-35 ☐ 36-45 ☐ 46 and above

Your level of education
☐ Primary School ☐ Middle School ☐ High School ☐ University ☐ Graduate

Item No.	Distance Education Parent Evaluation Form Items	I Strongly Agree	Agree	I'm undecided	Disagree	I strongly disagree
1	I want my child to receive an education he needs (which is not in BILSEM) through distance education.					
2	I want my child to take lessons from teachers in different BILSEMs via distance education.					
3	I want my child to take distance learning courses from academics at universities					
4	I think distance learning will meet my child's educational needs					
5	I think that distance education is a suitable alternative for the trainings that my child may need					

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Research Article

Bibliometric evaluation based on Web of Science database: nature and environmental education

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Abstract

The aim of this study is to present studies on nature and environmental education in related literature from 1977 to the present time by using bibliometric method. Nature and environmental education, which has an increasing popularity especially in the last years, gain a place in so many countries' teaching policy. Thus, increasing number of scientific studies and researches on this field in the related literature draw attention. In this study, publications in nature and environmental education have been examined both bibliometrically and in content, and their distribution by years, institutions, journals, citations and the features of co-works have been presented with descriptive and visual maps. Web of Science (WoS) Core Collection database has been used in obtaining data. "Nature education" and "Environmental education" terms were scanned with the aim of reaching highest number of studies from database. A total of 1312 publications have been included in study through various filtering processes. Bibliometric analysis techniques have been used in data analysis. VOSviewer programme has been used in determining the network analysis of those data obtained. In the study, the distribution of publications by years, the authors with the most publications, the journals, institutions and countries with the most publications have been determined. Besides, those data obtained have been discussed in the light of related literature by forming visual maps together with co-author, co-citation taken together, co-word and co-citation analyses. At the end of the study, some suggestions have been provided in the light of findings obtained.

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Introduction

The notion of nature has a wide of meaning burden that does not have sharp borders thanks to its dynamic structure and that is tried to be identified with so many definition. The notion of nature; was derived from "natura" word which has Latin root, beyond that, from "nasci" word meaning "be born" (Kahyaoğlu & Yetişir, 2015). In general meaning, it is defined as an open system with uncertain borders which shows a great colorfulness and diversity with its living and non-living elements, which affects and to be affected, which can change, which has the ability of renewal and forming, which formed without human effect and can exist without human, which has its own mechanisms and laws, which covers so many different factors, creatures, relationships, interactions and processes (Atasoy, 2005, p.73). The intensity

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of meaning attributed to the notion of nature also affects deeply people's relations towards nature. Some societies center people in their relations with nature; while some societies center nature itself and determine their lifestyles accordingly (Kahyaoğlu & Yetişir, 2015). Therefore, the mentality of living together with nature and giving value for it is the common legacy of all humanity. In this regard, the importance of nature education is growing day by day to understand and recognize nature and to leave a livable world to future generations. Nature education aims to know nature in the natural environment and to benefit from what nature offers as educational subjects, materials and tools (Aladağ et al., 2021). On that sense, it is important to use as education materials what nature offers (Keleş, 2011). Nature education is based on the idea of learning by living and doing with the original examples and models offered by nature in order for the learning to be more permanent (Başal, 2003). So, to understand various ways of people's giving value for nature in the interaction of people with nature (Krasny & Tidball 2012) and to create opportunities for more comprehensive evaluations and also to develop cultural interaction have become more and more important (Dendoncker et al., 2013).

Nature enables children to develop their imagination skills and to meet their game needs independently away from the adult world, improves children concentration skills and increases their motivations (Council for Environmental Education [CEE], 2004). Therefore, when in nature which is called out-of-school learning areas, education environment is moved out of a classroom to realize effectively the objectives and achievements of the lesson. Learning environment other than a classroom, provide individuals to be in a more comprehensive learning environment, concretize abstract concepts, have the chance of transferring and applying informations into their life, and develop so many affective skill by making possible for them to meet facts and events in life (Hazelworth & Wilson, 1990; Meredith et al., 1997; Pedretti, 1997; Ramey-Gassert, 1997). The nature which a synthesis product, necessitate knowledge, skill and attitude regarding different disciplines. So, nature education provides valuable contributions in holistic development of individuals and supports healthy development of individuals. In this regard, especially since the mids of 20th century, camp studies on nature education have become important (Garner, 2012). In those camps environmental educations have started to be given based on nature experience and applied (Dresner & Gill, 1994). On the other hand, applied activities in environmental education and first-hand experiences with programmes prepared by UNESCO-UNEP on environemtal educations and 1978 Tbilisi Declaration have increased the importance of nature education (Ozaner, 2004; Ünal & Dımışkı, 1999). Nature education for children should involve the relationship order of nature; namely the diversity in nature, ecological cycles, the functioning of the food chain, absorbing the coexistence of different species and how important nature is for the individual. In this way, it can be provided for individuals to understand their unity in the nature and their position in this unity by gaining a large scale perspective (Devall, 1994). Thus, out-of-school nature educations and natural area studies show students the relationships of different disciplines with each other, help students participating in those activities to understand well the subjects areas in their curriculum and support developing a better environmental awareness (Heather, 1999). Considering all these benefits, it can be said that nature education is a process that continues from preschool to the end of life and a neccessity that is needed in every moment of life. Thus, so many study findings empahsize the importance of ecologic programmes in positive change of individual behaviours towards environment and present the necessity of nature education for the formation of a healthier society perception (Başal, 2003; Bogner, 2002; Bogner & Wiseman, 2004; Çakmak, 2018; Ozaner, 2004). Besides, activities done in out-of-school environments helps for students to get information at their own learning pace and courages their learning behaviours (Melber & Abraham, 1999) and supports the education at schools (Gerber et al., 2001).

Environmental education which is often confused with nature education is planned for contributing to individuals' understanding of the natural environment, affecting their values and behaviors positively, and increasing the sensitivity towards environment. The outsanding structure in environmental education to gain environmental awareness, sensitivity about protecting and using the natural environment, and responsible behavior towards the environment and to make it sustainable (Erdoğan, 2009; Hungerford & Volk, 1990). Environmental education is an education which enables every level of people to understand the environment, makes them realize their place and role in it, and aimed at being aware of all the factors affecting the environment and being conscious in this context (Özbuğutu et al., 2014). In other words, it is to raise awareness about environmental events and gain desired behaviors for the solution of

environmental problems (Milton et al., 1995). Nature and environment contented education's happening in its natural environment raises the interest for nature, provides to look at life by empathizing with nature and to gain desired behaviours towards natural environment (Atasoy, 2005; Güler, 2009; Phenice & Griffore, 2003; Wells, 2000). Thus, the importance of natural environments is emphasized often for children development and well-beings and it is stated that individuals should increase their interactions with natural environment (Jickling & Wals, 2008; Taylor & Kuo, 2009; Wells, 2000). Although there have been many studies and researches in nature and the environment, issues like the deficiencies in environmental education, why we have not been successful in environmental education and what we should be done to solve these problems still keeps its validity and increase the importance of raising a youth to solve today's and tomorrow's environmental issues (Gigliotti, 1990; Krasny & Tidball, 2012). One of the most important reasons of this situation is that even if individuals have a developed environmental awareness, they do not have the knowledge about actual reasons lying under these environmental problems (Özbuğutu et al., 2014). In this regard, the mentality of contributing in development and progress of environmental education is not just an individual responsibility but also all of the societies' responsibility. Bogner ve Wiseman (2004) who draws attention to this, states that on the one hand students' perceptions on environmental protection increased with nature and environmental education, on the other hand nature education downgraded only "pragmatist" perceptions towards nature. In this regard, quality and accessible nature and environmental education should be planned for educators and children, more studies should be done on course designs and programs that strengthen conceptual knowledge and teaching expertise (Meier & Sisk-Hilton, 2017).

When examining researches regarding the field studies in nature and environmental education, it is seen that there are many studies from the past to the present (Aladağ et al., 2021; Bogner, 2002; Bogner & Wiseman, 2004; Dresner & Gill, 1994; Hazelworth & Wilson, 1990; Jickling & Wals, (2008), Krasny & Tidball, 2012; Kruse & Card, 2004; Wells, 2000). According to Kahyaoğlu (2015), In most of the studies in nature education, the effect of nature education on environmental attitudes has been handled. This is respectively followed by views on nature education, environmental knowledge, awareness, cognitive structure and the effect of responsible behaviors. Besides, it is seen that nature and environmental education given in out-of-school learning areas has positive effects on attitudes and behaviors of participant towards nature (Ballantyne & Packer, 2002; Farmer, et al., 2007; Mittelstaedt et al., 1999) and environmental awareness and responsible behavior awareness (Demir & Yalçın, 2014; Dresner & Gill, 1994; Hannaman, 2013; Kruse & Card, 2004). In this regard, examining of those publications in related literature under the nature and environmental education in terms of various features (author, year, journal, institution, country, etc.) is the basis of this study. As stated, meta-analysis and content analysis studies are few, besides the frequently published ones in nature and environmental education, ecology-based education, sustainable nature education in the related literature. It is important to present the general trends, author collaborations or citation networks of publications in nature and environmental education, in terms of lighting future studies in the field. Especially, to identify the fields of study, to see the missing parts and to form a basis for new studies are one of the contributions of bibliometric research to the literature. It is hoped that this study will fill the gap in the literature in terms of using bibliometric method regarding nature and environmental education and handling the features like general trends, author collaborations and cited publications. Thus, the bibliometric analysis method is an important analysis method in terms of showing researchers and readers general trends in any field or subject, and cooperation between authors, institutions and countries. Many studies and the relation of a publication to another can be analyzed deeply via bibliometric analysis method (Du et al., 2015; Grabowska & Saniuk, 2022; Wang et al., 2017). It is an important method in terms of showing the most important publications and authors and presenting the general trends in the field. In this way, bibliometric studies are important in terms of pointing out current issues as well as lighting researchers or readers who want to research on any subject.

Problem of Study

This study answers to the following sub-problems were sought within the scope of the study:

- What is the distribution of studies by years in Nature and Environmental Education?
- What is the distribution of studies by countries in Nature and Environmental Education?

- What is the distribution of studies by institutions in Nature and Environmental Education?
- What is the distribution of studies by journals in Nature and Environmental Education?
- What is the distribution of studies by authors in Nature and Environmental Education?
- What is the distribution of studies by most cited ones in Nature and Environmental Education?
- What is the distribution of studies by co-works in Nature and Environmental Education?
- What is the distribution of studies by citations taken together in Nature and Environmental Education?
- What is the distribution of studies by co-keywords in Nature and Environmental Education?
- What is the distribution of co-citations of studies in Nature and Environmental Education?

Method

Research Model

In this study, content analysis and bibliometric analysis have been used, which enables to be evaluated research results in the literature and scientific findings acquired from researches and to appear them in a comprehensive way. The bibliometric analysis method includes the usage of quantitative data in scientific studies and quantitative indicators of various databases (Du et al., 2015; Wang, et al., 2017). In other words, written documents have been examined with this study to reveal the knowledge structure and the development of research areas. In this regard, bibliometric analysis based on the use of quantitative methods was used (Pritchard, 1969). In the study, systematic literature network analysis has been used as a bibliometric analysis method. Critical trends and problems affecting knowledge development in a particular field are defined as more scientific and objective than descriptive reviews with this approach (Grabowska & Saniuk, 2022). Bibliometric practice, which is used in many disciplines often, is opted with the aim of searching specific qualifications of those scientific studies published in a specific area on the axis of statistical methods (Pritchard, 1969). By this means, feature review of studies on the related field have been done by sticking to the defined frameworks. Bibliometric reviews are seen as a method that subjects defined under the study field have been examined, evaluation and classifications of them have been done, state assessment has been done with realistic analysis in the light of data and efforts have been spent in understanding the details of those scientific studies (Borgman & Furner, 2002). One of the strongest ways of this kind of studies is that it contributes informations recorded to spread the large masses and to be used (Tague-Sutcliffe, 1992). In this regard, document analysis obtained from WoS database has been done within the scope of the study, which was designed depending on the qualitative understanding.

Data Collection and Procedure

Literature review on nature and environmental education has been done by using Web of Science (WoS) Core Collection which is a database from Clarivate Analytics. In this regard, all studies in English have been reviewed. The Web of Science database was used for bibliometric analysis as it is an interdisciplinary research platform that records more than 21,000 internationally accessable high-quality journals and more than 205,000 conferences, including international conferences. This database make possible to search in multiple databases simultaneously using a single interface through Web Science Core Collection. At the same time, Web of Science database is considered one of the most consistent databases of scientific publications (Zhao & Strotmann, 2015). Bibliometric analysis have been done by following the processes of planning the research, forming sub-problems, doing source review, deciding time zone, generating input codes, forming other analysis criteria, collecting and sorting of data, compiling data, comparing final outputs, presenting, defining and interpreting the results obtained (Grabowska & Saniuk, 2022). In this context, studies have been examined by years of publication, countries, institutions, journals, authors, most cited ones, co-works, co-citations taken together, common keywords, and co-citations. At the first step of the study, the review has been done by following the steps of "Search Documents Topic" in Web of Science and using "nature education" or "environmental education" terms and a total of 9212 studies have been reached. This review process was done on 24-25 April 2022. ESCI, SCI-EXPANDED, SSCI, CPCI-SSH, CPCI-S, A&HCI, BKCI-SSH, BKCI-S indexes and all years (1997-2022) have been included in this study. At the second step, the review continued by excluding document types like "letters, retracted publications, meeting abstracts, early access, book reviews, editorial materials, book chapters, review articles and proceedings papers" and ESCI,

CPCI-SSH, CPCI-S, BKCI-SSH, BKCI-S field indexes, 3516 article has been included in data analysis. Coding in reviewing of Web of Science contents is as follows: TS=("nature* education" or "environment* education") Refined by: [excluding] Document types: (letters or retracted publications or meeting abstracts or early access or book reviews or editorial materials or book chapters or review articles or proceedings papers) Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI" biographical item) Timespan: All years. Indexes: "SCI-EXPANDED, SSCI, A&HCI". At the other step, the process continued by choosing the category of Education Educational Research (Refined by [including]) from the Web of Science categories and a total of 1312 article has been included in the final evaluation. VOSviewer programme has been used in visualization of network analysis of the obtained data.

Findings

In this part of the research, firstly, the distribution of studies in nature and environmental education by years is given in line with the purpose of the study. Then there are the findings of the first 30 countries, the first 20 institutions, the first 20 journals, the first 20 authors and the first 20 most cited studies in nature and environmental education. Last, informations have been presented on co-author analysis, co-citation analysis, and co-keyword analysis. Accordingly, the graph showing the distribution of studies in nature and environmental education by years is presented below (Figure 1).

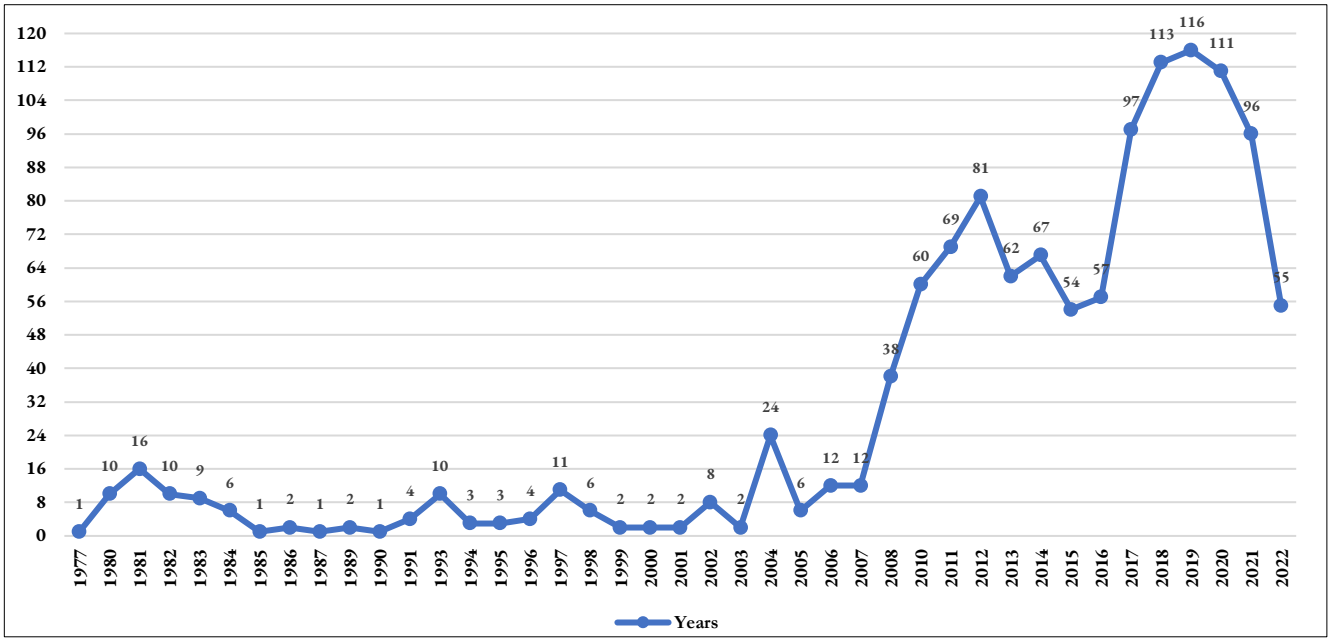

Figure 1. *Distribution of Studies in Nature and Environmental Education by Years*

Looking over Figure 1, a total of 1312 atricles have been published between1977-2022 in Education Educational Research (EER) category. Most articles have been published in 2019 (116), while least articles have been published in 1977, 1985, 1987 and 1990 (1). A growing trend in nature and educational studies draws attention especially in the time period from 2007 to 2020. The number of studies, which was stable between 1977 and 2005, gained momentum after 2005 and this growing trend continued until 2012. The distribution chart of the first 30 countries where the most research done in nature and environmental education is presented below (Figure 2).

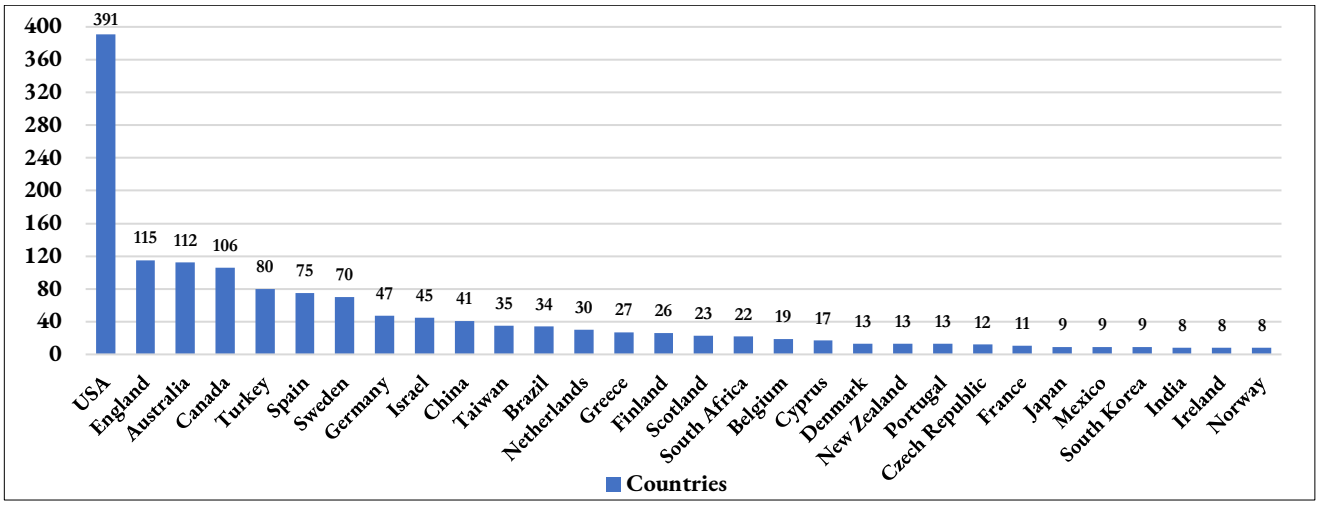

Figure 2. *The Distribution of The First 30 Countries Where The Most Research Done in Nature and Environmental Education*

Looking over Figure 2, the country where the most research have been done in nature and environmental education is by far the USA (United States of America) (391). It is respectively followed by England (115), Australia (112), Canada (106), Turkey (80), Spain (75), Sweden (70), Germany (47), Israel (45), China (41), Taiwan (35), Brazil (34), Netherlands (30), Greece (27), Finland (26), Scotland (23), South Africa (22), Belgium (19), Cyprus (17), Denmark (13), New Zealand (13), Portugal (13), Czech Republic (12), France (11), Japan (9), Mexico (9), South Korea (9), India (8), Ireland (8), and Norway (8). The distribution chart of the first 20 institutions where the most research done in nature and environmental education is presented below (Table 1).

Table 1. *The Distribution of The First 20 Institutions Where The Most Research Done in Nature and Environmental Education*

Affiliations	Record Count	%
League of European Research Universities	28	2.13
University of North Carolina	24	1.82
Virginia Polytechnic Institute State University	24	1.82
Monash University	22	1.67
Cornell University	20	1.52
Pennsylvania Commonwealth System of Higher Education	20	1.52
Pennsylvania State University	19	1.44
Stanford University	19	1.44
California State University System	18	1.37
Clemson University	18	1.37
University of London	18	1.37
Deakin University	17	1.29
Pennsylvania State University Park	16	1.22
State University System of Florida	16	1.22
University of California System	16	1.22
University of Wisconsin System	16	1.22
Stockholm University	15	1.14
University of Bath	15	1.14
University of Bayreuth	14	1.06
University of Edinburgh	14	1.06

Looking over Table 1, League of European Research Universities (28) is the institution doing the most research in nature and environmental education. This is respectively followed by the University of North Carolina (24), Virginia Polytechnic Institute State University (24), Monash University (22), Cornell University (20), Pennsylvania Commonwealth System of Higher Education (20), Pennsylvania State University (19), Stanford University. (19), California State University System (18), Clemson University (18), University of London (18), Deakin University (17), Pennsylvania State University Park (16), State University System of Florida (16), University of California System (16), University of Wisconsin System (16), Stockholm University (15), University of Bath (15), University of Bayreuth (14) and University of Edinburgh (14). The distribution chart of the first 20 institutions that published the most research in nature and environmental education is presented below (Table 2).

Table 2. *The Distribution of The First 20 Institutions that Published The Most Research in Nature and Environmental Education*

Publication Titles	Record Count	%
Environmental Education Research	495	37.72
Journal of Environmental Education	210	16.00
International Journal of Science Education	58	4.42
International Journal of Sustainability in Higher Education	31	2.36
Journal of Biological Education	27	2.05
Eurasia Journal of Mathematics Science and Technology Education	24	1.82
Research in Science Education	24	1.82
Ensenanza de Las Ciencias	20	1.52
Journal of Philosophy of Education	20	1.52
Chinese Education and Society	17	1.29
Journal of Geography in Higher Education	15	1.14
Journal of Baltic Science Education	14	1.06
Science Education	14	1.06
Cultural Studies of Science Education	13	0.99
Journal of Curriculum Studies	13	0.99
Studies in Educational Evaluation	13	0.99
International Journal of Educational Development	11	0.83
Journal of Research in Science Teaching	11	0.83
Educational Sciences Theory and Practice	11	0.83
Educational Philosophy and Theory	10	0.76

Looking over Table 2, Environmental Education Research (495) is the journal which published the most research in nature and environmental education. This is respectively followed by the Journal of Environmental Education (210), International Journal of Science Education (58), International Journal of Sustainability in Higher Education (31), Journal of Biological Education (27), Eurasia Journal of Mathematics Science and Technology Education (24), Research in Science Education (24), Ensenanza de Las Ciencias (20), Journal of Philosophy of Education (20), Chinese Education and Society (17), Journal of Geography in Higher Education (15), Journal of Baltic Science Education (14), Science Education (14), Cultural Studies of Science Education (13), Journal of Curriculum Studies (13), Studies in Educational Evaluation (13), International Journal of Educational Development (11), Journal of Research in Science Teaching (11), Educational Sciences Theory and Practice (11) and Educational Philosophy and Theory (10). The distribution chart of the first 20 authors who have done the most research in nature and environmental education is presented below (Figure 3).

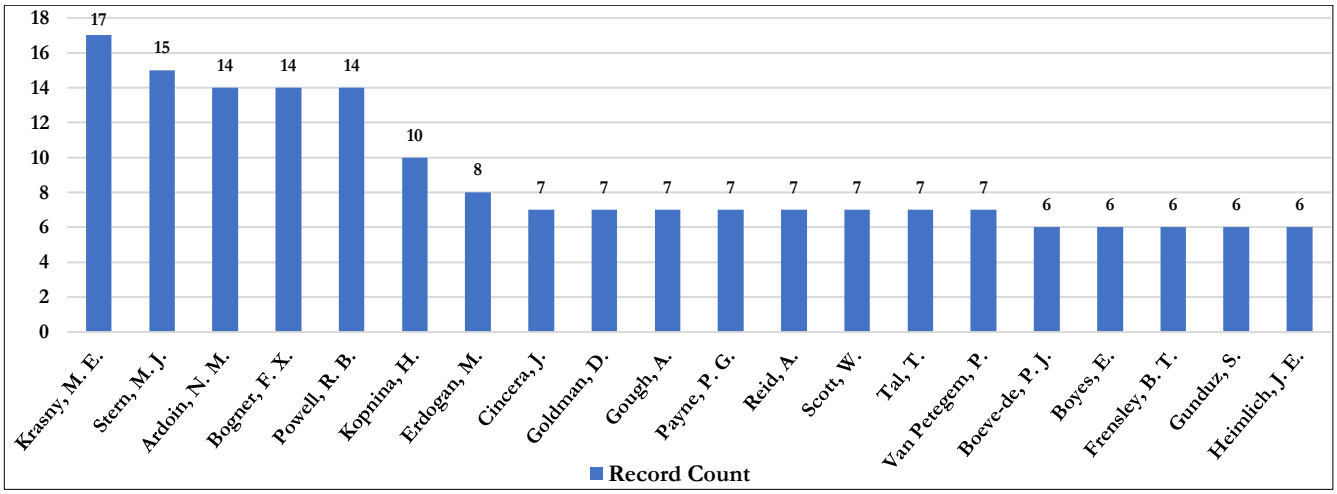

Figure 3. *The Distribution of The First 20 Authors Who Have Done The Most Publication in Nature and Environmental Education*

Looking over Figure 3, Krasny, M. E. (17) is the author who did the most research in nature and environmental education. This is respectively followed by Stern, M. J. (15), Ardoin, N. M. (14), Bogner, F. X. (14), Powell, R. B. (14), Kopnina, H. (10), Erdogan, M. (8), Cincera, J. (7), Goldman, D. (7), Gough, A. (7), Payne, P. G. (7), Reid, A. (7), Scott, W. (7), Tal, T. (7), Van Petegem, P. (7), Boeve-de, P. J. (6), Boyes, E. (6), Frensley, B. T. (6), Gunduz, S. (6), and Heimlich, J. E. (6). The distribution chart of the first 20 most cited studies in nature and environmental education is presented below (Table 3).

Table 3. *The Distribution of The First 20 Most Cited Studies in Nature and Environmental Education*

Articles	Number of Citation	Number of Citation/Years
The new environmental paradigm scale: from marginality to worldwide use	452	32.28
Globalization and environmental education: looking beyond sustainable development	313	22.35
The child in the garden: an evaluative review of the benefits of school gardening	228	17.53
Ecomobile: integrating augmented reality and probeware with environmental education field trips	213	23.66
The action competence approach and the “new” discourses of education for sustainable development, competence and quality criteria	195	16.25
Education for sustainable development (ESD): the turn away from 'environment' in environmental education?	186	18.60
Significant life experiences-a new research area in environmental-education	184	4.38
Promoting connectedness with nature through environmental education	173	19.22
Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education	151	12.58
Sense of place in environmental education	128	12.80
Evaluating the effects of environmental education programming on connectedness to nature	121	11.00
Revealing the research 'hole' of early childhood education for sustainability: a preliminary survey of the literature	119	9.15
The importance of connection to nature in assessing environmental education programs	110	13.75
Outdoor adventure education: applying transformative learning theory to understanding instrumental learning and personal growth in environmental education	108	9.81
Introducing a fifth pedagogy: experience-based strategies for facilitating learning in natural environments	107	8.23

Enhancing learning, communication and public engagement about climate change-some lessons from recent literature	101	12.62
The study on integrating WebQuest with mobile learning for environmental education	98	8.90
Multi-level assessment of scientific content knowledge gains associated with socioscientific issues-based Instruction	98	8.16
Goals for curriculum-development in environmental-education	96	2.28
Beyond stewardship: common world pedagogies for the anthropocene	95	19.00

Looking over Table 3, “the new environmental paradigm scale: from marginality to worldwide use” (452) is the one which most cited research article in nature and environmental education. This is respectively followed by "globalization and environmental education: looking beyond sustainable development" (313), "the child in the garden: an evaluative review of the benefits of school gardening" (228), "ecomobile: integrating augmented reality and probeware with environmental education field". trips” (213) and “the action competence approach and the “new” discourses of education for sustainable development, competence and quality criteria” (195). When considered by the number of citations and year rate, "the new environmental paradigm scale: from marginality to worldwide use" (32.28) is in the first place, while "ecomobile: integrating augmented reality and probeware with environmental education field trips" (22.35) is in the second place and “globalization and environmental education: looking beyond sustainable development” (22.35) is in the third place. Findings on the co-author analysis of studies in nature and environmental education are presented below (Figure 4).

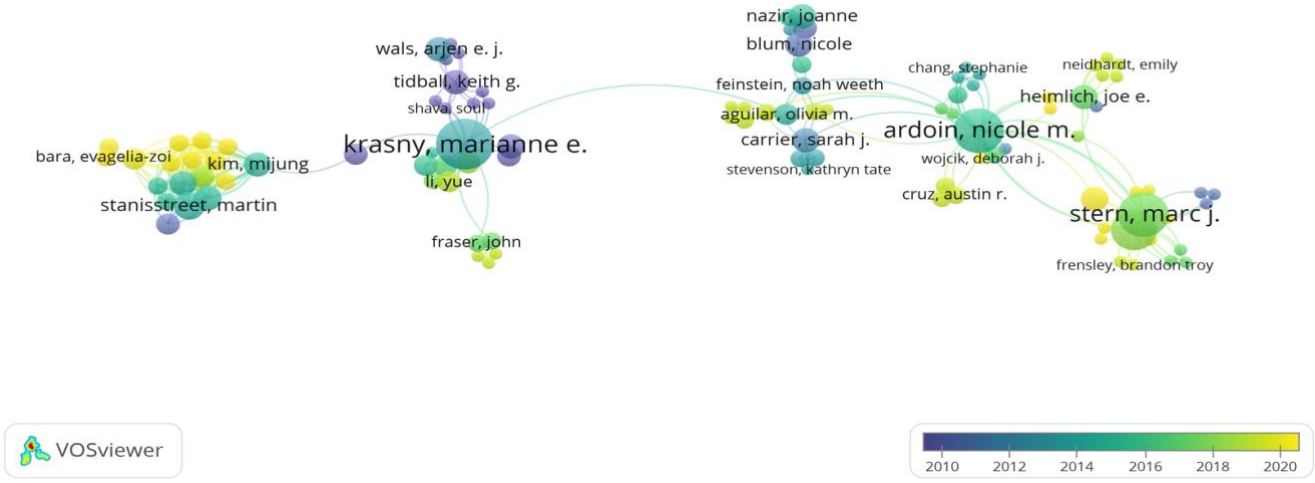

Figure 4. *Co-Author Network Analysis of Studies in Nature and Environmental Education*

Looking over Figure 4, it is seen that co-publishing authors in the co-analysis of the studies in nature and environmental education usually work separately and in groups. Co-publishing authors were divided into 12 clusters in different colors (items: f=103) under the criterion of having at least one publication. It is seen that the authors publishing on nature education mostly work among themselves and they have different and broad connections. Along with these, even if there has been a decrease in the number of co-author studies in recent years, it can be said that there is an increasing trend in co-work. Especially, it is seen that authors like Krasny, M. E., Stern, M. J, Ardoin, N. M. Stanisstreet, M., and Powell, R. B. form focus networks. The findings on the co-citation analysis of studies in nature and environmental education are presented below (Figure 5).

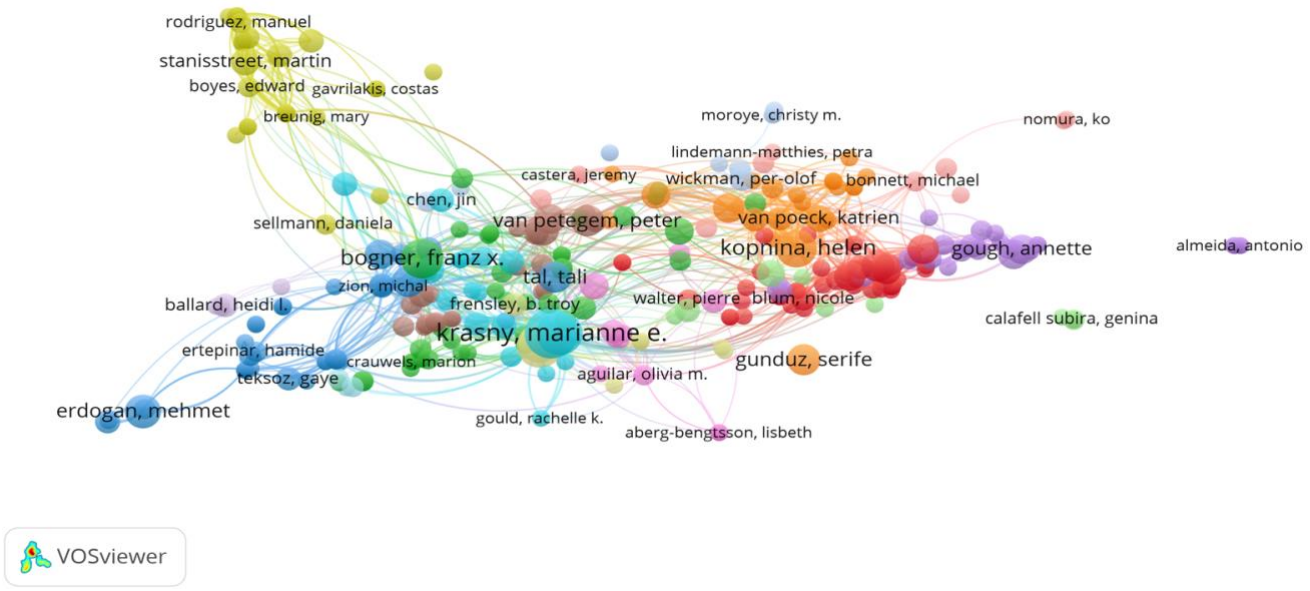

Figure 5. *Co-citation Network Analysis of Studies in Nature and Environmental Education*

Looing over Figure 5, 2182 links have been obtained in 15 different colored clusters (items: f=311, total link strength: 3447) in the co-citation analysis of studies in nature and environmental education. Especially, Krasny, M. E. (17 documents, 612 citations, 197 total link strength), Stern, M. J. (13 documents, 232 citations, 149 total link strength), Ardoin, N. M. (13 documents, 271 citations, 145 total link strength) and Powell, R. B. (11 documents, 203 citations, 137 total link strength) take the lead in co-citation analysis. Other than these, so many focus researchers have been in contact except Krasny, M.E in researches regarding nature while there have been researches which do not have strong connections in co-citaion index. Findings on the co-keyword analysis of studies in nature and environmental education are presented below (Figure 6).

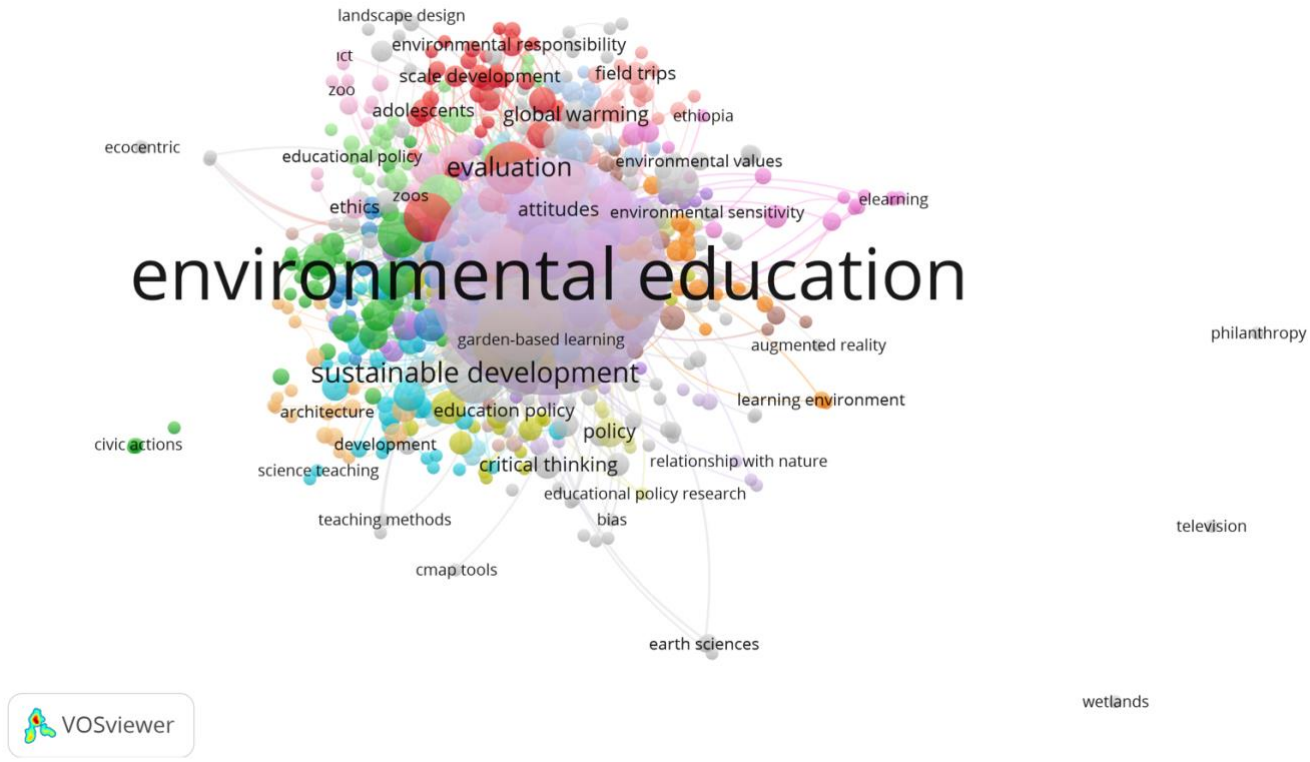

Figure 6. *Co-Keyword Network Analysis of Studies in Nature and Environmental Education*

Looking over Figure 6, it is seen that 63 different clusters (items: f=623) made 3324 connections with each other in the common keyword analysis of studies in nature and environmental education. When breakpoint 2 is taken, outstanding keywords among the links are respectively as follows: environmental education (610 occurrences, 1429 total

link strength), sustainable development (77 occurrences, 214 total link strength), sustainability (51 occurrences, 148 total link strength), higher education (43 occurences, 105 total link strength), climate change (35 occurences, 99 total link strength), environmental literacy (42 occurrences, 97 total link strength) and science education (36 occurrences, 93 total link strength). Environmental education keyword, which to be in the focus, has been used often with the words like environmental values, environmental sensitivity, critical thinking, development, evaluation, environmental education, zoo, global warming, garden-based education, attitude, education policy.

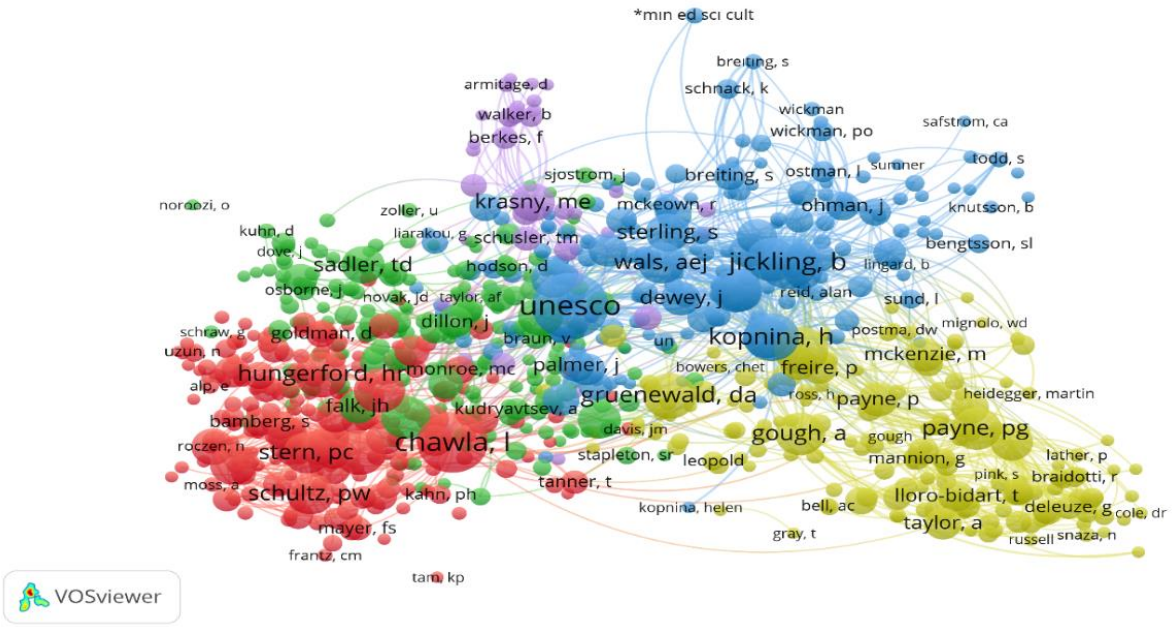

Figure 7. *Co-Citation Network Analysis of Studies in Nature and Environmental Education*

Lookin over Figure 7, it is seen that there are clusters in 5 different colors (items: f=828) in the co-citation (breakpoint 10) of studies in nature and environmental education. Besides, it is said that the contact and bond between the authors frequently cited in the publications is quite intense and strong. Co-citation enables authors to reach publications that have a strong impact on related publications in terms of citing two different publications in a scientific study. Therefore, analysis of co-citations which made in related field with a specific publication is important. Especially the number of co-citations are too many in works by Chawla, I. (283 citations, 7043 total link strength), UNESCO (332 citations, 7024 total link strength), Jickling, B. (220 citations, 6550 total link strength) and Kopnina, H. (178 citations, 4773 total link strength). The cluster in blue color covers 732 nodes, the cluster in red color 683, the cluster in yellow color 470, the cluster in green color 336 and the cluster in purple color 139 nodes. Therefore, the cluster blue is the one with the highest knot density.

Discussion and Conclusion

In this study, it is aimed to put studies that was done between 1977-2022 in nature and environmental education with bibliometric method. In this regard, first of all, distribution by years of the articles in nature and environmental education has been examined. According to the findings, it was seen that articles published were on a specific rate although there was an increase at specific times between 1977-2022 (1980, 1981, 1993, 1997, 2004). However, it draws attention that there is a remarkable spike at the numbers of studies at this field after 2007. Especially, studies numbers reached its first climax in 2012, then all time high in 2018, 2019 and 2020. Even if there has been a sharp decrease in study number at this field as of 2021, it can said that study numbers until 24-25 April, 2022 when the research was done has remained high compared to the past years. Pandemic (COVID-19) could be pointed out as one of the important reasons along with so many basic reasons for the decrease in study number published in 2021 (Aladağ et al., 2021; Grabowska & Saniuk, 2022). However, it draws attention that there has been a remarkable decrease on study numbers regarding nature and environmental education when considering the start ranges of the Covid-19 pandemic. As all know, nature and

environmental education is a learning activity that is done out-of-school environments. As Ozaner said (2004), nature education is done in nature, not in the classes. Hence, conducting these kind of studies cause difficulties like time, money and work burden. However, when considering the study numbers, it draws attention that there is an increasing interest in nature and environmental education. This situation has positive effects and the need of giving much more importance to this field has been supported with so many study findings (Gigliotti, 1990; Güler, 2009; Meier & Sisk-Hilton, 2017; Phenice & Griffore, 2003; Ramey-Gassert, 1997).

The other finding of the study was obtained from the countries with most resarch in nature and environmental education. At this field, United States of America is by far the first with twice as much studies than England which is the closest country to itself. England, Australia and Canada are the countries which have close study number rate to each others among 30 country that researched at this field. This is respectively followed by Turkey, Spain, Sweden, Germany and Israel. So many countries' having researched at this field show that countries are trying to increase the effectiveness at this field. However, when examing the study numbers of the countries after the first seven countries, it can be said that study numbers at this field are not at desirable levels. Altough there have been studies in nature and environmental education in so many different countries, the unbalance on study numbers of countries draw attention. In this regard, it is really important both leading countries like USA, England, Australia and Canada should focus more colloboration with other countries and similarly, countries with insufficient study numbers should be in contact with those countries. Kahyaoğlu (2015) who draws attention to this, state that humanity became desensitized because of technological developments and progresses and at the same time, the disharmony between education and training systems, urbanization, and the decrease in natural areas keep individuals away from nature day by day. Therefore, even if some countries do so many researches at this field, other countries' tendency for it pose great importance (Hannaman, 2013; Taylor & Kuo, 2009; Ünal & Dımışkı, 1999).

The other finding of the study was obtained from institutions where most research has done in nature and environmental education. According to this, League of European Research Universities which is a search-based network inter European Universities takes the lead at this area. This is respectively followed by The United States University of North Carolina, Virginia Polytechnic Institute State University, Cornell University, Pennsylvania Commonwealth System of Higher Education which are USA Universities and Monash University from Australia. According to these findings, it can be said that studies about this field mostly concentrate on state and foundation universities of United States of America. Even if there are studies on this field in state universities of countries like Australia, England and Germany which are from the first 20 insitutions, universities of United States of America mostly has taken the lead in publishing more studies on nature and educational environment and supported researchers. In positive changes of individuls' behaviors towards nature, the importance of ecologic programmes has reflected on so many study's findings (Başal, 2003; Bogner, 2002; Bogner & Wiseman, 2004; Ozaner, 2004) and it was determined that activities done in out-of-school environments helps for students to get information at their own learning pace and courages their learning behaviours (Aladağ et al., 2021; Farmer et al., 2007; Gerber et al., 2001; Melber & Abraham, 1999). Therefore, having diversity in institution number supporting studies in nature and environmental education and their more support in related field is really important. Limited number of institutions' coming to the forefront at this area could cause limitations in terms of both qualification and quality of studies.

The other finding of the study was obtained from journals publishing studies in nature and environmental education. In line with this, Environmental Education Research journal has published important studies at this field and published twice as much studies than Journal of Environmental Education which is the closest to itself. Environmental Education Research journal also has contained in itself more than one of three of all studies published and leads in this study number at this field compared to the other journals. There are, of course, so many different reasons for this, but publishing frequency, prestige and productivity of journal boards can be shown as the most important reasons. On the other hand, other journals in the first 20 in nature-environment education are International Journal of Science Education, International Journal of Sustainability in Higher Education, Journal of Biological Education, Eurasia Journal of

Mathematics Science and Technology Education, Research in Science Education, Ensenanza de Las Ciencias, Journal of Philosophy of Education and Chinese Education and Society.

The other finding of the study was obtained from the authors with most research in nature and environmental education. According to this, Krasny, M.E. is the author who has the highest number at this field. This is respectively followed by Stern, M. J., Ardoin, N. M., Bogner, F. X., Powell, R. B., Kopnina, H., Erdogan, M., Cincera, J., Goldman, D., Gough, A., Payne, P. G., Reid, A., Scott, W., Tal, T., and Van Petegem, P. Studies on this field has been handled and examined by so many different author. However, specific journals distinguish at this field. Hence, increase in the numbers of specific journal can contribute to this field. Especially, content and subject oriented journals can present valuable contributions. It is known that giving real life experience to students and forming learning environments that will enable them to obtain first hand experience increase their gains and cognitive learning inside and outside the classroom (Aladağ et al., 2021; Gerber et al., 2001; Melber & Abraham, 1999; Heather, 1999). In this regard, it can be helpful that different type of journals publish studies that have similar trends and increase the number.

Another finding from the research was obtained from the studies most cited in nature and environmental education. In this regard, "the new environmental paradigm scale: from marginality to worldwide use" is the publication that is the most cited. The study's being a scale and having practice use in so many study are one of the reasons for this. This is respectively followed by "globalization and environmental education: looking beyond sustainable development" and "the child in the garden: an evaluative review of the benefits of school gardening". Considering the ratio of the citations from the publication year to the present day, "the new environmental paradigm scale: from marginality to worldwide use" is the first, while the study named "ecomobile: integrating augmented reality and probeware with environmental education field trips" is the second and the study named "globalization and environmental education: looking beyond sustainable development" is in the third place. One of the most important features of this study is that environmental education issue has been handled from a broad perpecitve and the mentality of sustainability has ruled. Besides, they have the contents of not only for the society they live in but also for all other societies. At the same time, these studies have been published in prestigious, high quality journals scanned by many field indexes. So many institutions and organizations can access easily these journals which have wide target audience. Students can learn concepts related to nature, environment and science more easily in out-of-school areas than in a classroom (Ballantyne & Packer, 2008; Bogner, 1998; Bogner & Wiseman, 2004; CEE, 2004; Devall, 1994). In this regard, it may be beneficial for researchers studying in this field to focus on the studies in this direction in order to obtain more citations.

One of the distinct findings of the study was obtained from co-author network analysis in nature and environmental education. It is seen that co-publishing authors in the co-analysis of the studies in nature and environmental education usually work separately and in groups. According to this finding, interest for studies at this field shows continuity and it has been addressed by so many authors. Although it is evident in the color scale that there has been a decrease in co-author studies in recent years, it draws attention that the intensity of co-publishing in this area is high, especially between 2012 and 2016. In particular, authors like Krasny, M. E., Stern, M. J, Ardoin, N. M. Stanisstreet, M., and Powell, R. B. forming focus networks shows that they have significant works in this area. The other distinct feature of the findings is the interaction among the authors who do not co-publish. It is seen that the authors co-publishing at this field are in close cooperation with each other, as well as on the issue of co-authors. Out-of-school areas are very effective environments for teaching basic concepts about the environment and nature. These environments are important learning materials for students to see the cycles in nature and the cause and effect relationship in natural life. Trainings and field trips planned in natural areas help students to gain both cognitive, affective and psychomotor gains (Erdogan, 2009; Farmer et al., 2007). Education in nature gives students an interdisciplinary perspective by bringing together different disciplines, and supports the multidimensional development thinking skills. In this regard, studies that will be formed at the end of a collaboration of writers from different cultures, languages and countries will have significant contributions to the field. It will be very valuable in the formation of qualified studies that different numbers of authors take part together in studies to be done at this field.

Another finding of the study was obtained from the co-network analyses of studies in nature and environmental education. According to this, in the co-citation network analysis, there were 15 different colored clusters and it was determined that these clusters were in intense interaction with each other. Especially, Krasny, M., Bogner, F. X., Kopnina, H., Erdogan, M., Stern, M. J., Ardoin, N. M., and Powell, R. B. are prominent authors in co-citation network analysis. It can be said that, in the citation index with a strong network, researchers follow each other's publications closely and are aware of their current studies in nature-environment education. Even if there are co-citations for independent studies, it can be said that the overall pattern has a dynamic structure and is frequently cited within itself. On the other hand, having more than one focus point provides important clues regarding the richness and content of the studies. This situation emphasizes the productivity of study numbers at this field and shows that many researchers are in interaction. Although this situation is quite positive, it is important to have more interaction for increasing the nature and environmental awareness of societies.However, considering the fact that today's children live further away from nature, not just an information-based but also a holistic environmental education that students could interact with nature directly and grasp the unity in nature, with activities in appropriate natural areas are needed (Demir & Yalçın, 2014; Heather, 1999; Hungerford & Volk, 1990; Jickling & Wals, 2008).

One of the distinct findings of the study was obtained from co-keyword network analysis in nature and environmental education. In the analysis which there are 63 clusters in different colors, it was determined that there was a dense network. According to this, the notion of environmental education has been the most preferred keyword by researchers. According to this finding, it is expected that this notion will be preferred more in studies whose focus is in environmental education. However, many factors come forward in the use of these notions because similar notions related to environmental education are generally used in expressions with similar meaning burden. Looking at the related literature, it is seen that the notions of environment and nature are used interchangeably (Erdogan, 2009; Ozaner, 2004). For this reason, sharp distinctions were not made when examining the studies, and conducting studies were evaluated together. On the other hand, the notions of sustainable development, sustainability, higher education, climate change, environmental literacy and science education were frequently used as keywords by researchers. The remarkable detail here is that studies shows sustainability and continuity. Hence, the importance of sustainability was emphasized and frequently used in many keywords. Other than these, notions such as learning, teaching, evaluation, global warming, zoo, science, garden-based teaching, environmental values, and education policy were frequently used as keywords by researchers. When the structure of the network analysis is examined in general, it draws attention that there is an intense interaction among word groups.

Altough the notion of environmental education is the focus, the usage of different types and numbers of keywords point out a rich network structure. The environment together with human, livings and non-livings, is defined as an open system with its physical, chemical, biological and social factors affecting all kinds of actions and behaviors of livings (Atasoy, 2005; Kahyaoğlu & Yetişir, 2015). As is seen, the environment is a very comprehensive and borderless notion. Therefore, it can be said the studies have been carried out mostly with the notion of environment and that the components of the environment notion has been handled least. However, considering the components of the notion of environment, it can be said that many metaphor studies can be done about how people perceive the environment (Çakmak, 2018). In this regard, keywords in studies should be handled in a way that they reflect more subject content and should include diversity in terms of reaching more people.

The last finding was obtained from the co-citation network analysis of studies in nature and environmental education. According to this, it draws attention that there is an intense network in 5 different colors. It is also seen that the interaction level and network connection among the authors frequently cited in the publications are quite intense and strong. Especially, it was determined that the number of co-citations is quite high and they have focal points in the studies conducted by Chawla, I., UNESCO, Jickling, B. and Kopnina, H.. So much so, the blue cluster consists of 732 nodes, the red cluster 683, the yellow cluster 470, the green cluster 336 and the purple cluster 139 nodes. Therefore, the blue cluster has been with the highest knot density. That is to say, UNESCO has taken part in co-citations in many studies, in a way that it would be the focal point. One of the remarkable points of the network structure is that the

number of citations in many authors studies is in a dense pattern. This finding points out the richness of the studies in terms of content and the intensity of the sources used in different types. However, scientific studies and projects are carried out and reported in many countries in nature and environmental education. In this regard, it can be said that there is an intense interaction in reaching the publications that have a strong impact on the related publications. According to the findings, it can be said that the studies at this field are in a close relationship with each other. Along side all these expressions, there are certain limitations of the study. One of the most important limitations of the study is that the terms of nature and environmental education are at the center of the research. Besides, the resources in the study were limited to the WoS database and the search category was chosen as Education Educational Research. In this regard, there may be differences in the content of the studies in different categories. The date of scanning was also limited to 24-25 April 2022, and studies uploaded to the system after this date were not included in the study. Therefore, whole of 2022 and other WoS categories can be included in the studies to be done in a similar way. In this way, the trends and contents of the studies at this field can be presented with a broader perspective.

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Research Article

Analysis of the relationship between mathematics teacher candidates' reflective thinking levels and their philosophical views on the nature of mathematics

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Abstract

The main aim of the present study with relational screening model was to analyze the relationship between reflective thinking skills and philosophical views regarding the nature of mathematics (NoM) in secondary school mathematics teacher candidates. In addition, it was aimed to determine whether the reflective thinking levels of the candidates displayed a significant difference according to absolutist, mixed, and semi-experimentalist groups. The study group consisted of 196 secondary school mathematics teacher candidates studying in the mathematics teaching program in the spring semester of the 2021-2022 academic year. As data collection tools, The Scale for Determining Philosophical Views Regarding the NoM and The Scale for Determining the Level of Reflective Thinking were used. In the analysis of the data, in addition to descriptive statistics, Pearson Product-Moment Correlation Coefficient and multiple linear regression analysis were employed. In the study, it was determined that both reflective thinking levels and the philosophical views regarding the NoM were found to be high in mathematics teacher candidates. Besides, it was determined that there was a positive and moderate relationship between the reflective thinking level subdimensions and and the philosphocial views on the NoM in the teacher candidates, and that the variables of the reflective thinking level subdimensions explained 44% of the variance in the philosophical views on the NoM. Moreover, it was concluded that there was a statistically significant difference between the semi-experimentalist group and the mixed and absolutist groups in favor of the semi-experimentalist group in terms of critical reflection, reflection and understanding skills, and between the absolutist group and the mixed and semi-experimentalist groups in favor of the absolutist group in terms of habitual actions subdimension.

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Introduction

The reflective thinking approach is based on the objectives of the pragmatic philosophy movement led by John Dewey (1933). Dewey dealt with reflective thinking as an active process that requires attention and interpreted reflection as reorganization of the current experience. On the other hand, Mezirow (1991) stated that reflective thinking is a critical evaluation process and classified this situation in four dimensions as habitual actions, understanding, reflection, and critical reflection. Habit, which is accepted as one of the keystones of reflective thinking, consists of actions that

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individuals start to perform without much conscience and thinking as a result of repetitions (riding a bicycle, using the keypad, play on phone, dancing, etc.) Understanding is the individual's accepting an existing situation as it is. Reflection, is the individual's making a meaning for himself/herself and gaining a new perspective at the end of the process. Finally, critical projection is the state of being aware of why individuals perceive, reason, internalize and behave in a certain order (trans: Kember et al., 2000). To Mezirow, individuals with reflective thinking skill can make decisions related to the solution of their problems, implement them, and produce new ideas by evaluating the results. In reflective thinking, it is important for the individual to evaluate and criticize himself/herself (Arslan, 2017; Bozan, 2021). One of the strengths of reflective thinking is that it helps individuals to learn and improve their understanding while realizing teaching activities. In applications performed for reflective thinking skill, students are expected to predict, explore basic facts, and verify their skills to solve mathematics questions. Reflective thinking skills help individuals take responsibility for their learning, define their goals, organize their knowledge, establish a link between theory and knowledge, acquire new knowledge, take more action, and perform their learning processes efficiently (Cengiz & Karatas, 2016). Furthermore, it enables teachers to understand what their students experience in teaching and understanding math by providing support to teachers in coping with the problems they encounter in teaching practices (Toker, 2016). For this reason, it is very valuable that not only teachers but also teacher candidates have this skill and reflect it in the learning environment in order for students to think reflectively.

Ersözlü (2008) interpreted reflective thinking as the individual's self-monitoring, evaluation and recognizing negative behaviors and improving them. If we look at the reflections of reflective thinking in education, it is seen that teachers and students constantly observe themselves, question, evaluate and make self-criticism (Maviş, 2014). Reflective thinking skills of mathematics teachers are accepted as a prerequisite for the realization of the objectives in mathematics education, producing solutions for the problems encountered in the learning environment, and evaluating the experiences gained (Nian, 2020). Therefore, teachers always need to reflect on their teaching applications. The effectiveness of a teacher in the classroom is closely associated with the reflective thinking skills of that teacher on his/her teaching activities (Maksimović & Osmanović, 2019). Especially, the fact that today's mathematics education aims to bring up individuals who have high-level skills such as producing solutions for the problems encountered, and expressing reasoning in this process, making predictions, making evidence-based inferences, and managing one's own feeling and teaching indicators brings important responsibilities to the teachers as well (Ministry of National Education [MoNE], 2018). For these reasons, it is important that teachers should improve their students' reflective thinking skills and encourage them in this regard. However, realizing reflective thinking in students' behaviors is closely related to students' having these characteristics. In this context, reflective thinking should be considered as a necessary part of teacher training and teaching curricula, and awareness of teachers should be increased (Aldahmash et al., 2021; Keskinkılıç-Yumuşak, 2015; Yıldırım, 2012). Findings obtained in studies conducted in the literature emphasize equipping teachers with these competences and frequently indicate the importance of bringing up individuals who have reflective thinking skills (Lee, 2005; Mullis et al., 2012). Hence, it is considered important for teachers to have positive attitudes, perspectives, opinions, thoughts, feelings, and beliefs about the nature of mathematics (NoM), along with high-level thinking skills (Gess-Newsome, 2015).

Beliefs about NoM, involves responses obtained to the questions such as what mathematical knowledge is and how it is acquired. With another aspect, these beliefs are composed of interpretations related to the structure of mathematical knowledge, the existence of mathematical entities, and why mathematics exists (Durmaz, 2016). In this context, philosophical views regarding the NoM are divided into two as absolutists and semi-experimentalists (Baki, 2014: Lee, 2005; Tatto et al., 2008). Those included in the first group think that knowledge has a structure that is absolute, accurate, and consists of unrelated individual parts (Sanalan et al., 2013). The other group believes it was created by the individual through reason or based on empirical evidence (Deryakulu, 2002). According to the absolutists, mathematical knowledge involves certainty, and therefore, it cannot be considered wrong and cannot be changed (Baki, 2014). Besides, it is accepted that the ability to learn is an innate and unchangeable skill, and that an individual will learn a subject either immediately or never (Deryakulu, 2002). On the other hand, according to the semi-experimentalists, mathematical

knowledge is a product of humans and therefore its truth is not absolute, it can be accepted as wrong, and it can be corrected (Baki, 2014). In other words, mathematical knowledge is always open to development and change (Deng, 1995). At the same time, it is argued that mathematical knowledge has a complex structure that is composed of many interrelated parts, and that it is formed by individuals based on reasoning or experimental evidence (Deryakulu, 2002). As a result of these two contradictory views, the ideas that mathematics is an abstract and intellectual pursuit independent of other sciences and that it is an entity used for the benefit of other sciences have developed (Aghadiuno, 1992).

When the effect of views regarding the NoM on teachers' practices are examined, it is seen that the majority of factors such as the teacher's role in the classroom, teaching practices, the methods, strategies and techniques used are affected by the perspectives of the teachers regarding the NoM. It is well-documented that especially the teacher candidates with an absolutist view prefer to directly transfer the knowledge in their classes (Ernest, 1989). Teachers with this perspective additionally believe that it would be enough for students to know certain rules (Işıksal et al., 2007). On the other hand, it has been found in many studies conducted that teacher candidates with semi-experimentalist view design a learning environment for their students in which they can engage in mathematics, and that the environments designed increase students' achievement (Baki, 2014; Baş et al., 2015; Handal, 2003; Lee, 2005). Accordingly, developing the beliefs of teacher candidates regarding the NoM and raising their awareness in this regard will significantly contribute to increasing the quality of learning environments. In fact, it has been emphasized in the mathematics teaching program that students need to question mathematical concepts in the exploration process and internalize the concepts by understanding them, and that learning environments should be designed in line with the interests and needs of the students (MoNE, 2018). In this respect, teachers are expected to use teaching methods and strategies appropriate for the NoM. Especially in recent years, the number of studies on both the teacher candidates' views on the NoM and their reflective thinking skills have increased (Agustan et al., 2016; Akman, 2019; Aydın & Çelik, 2017; Korumaz & Özkılıç, 2015; Sanalan et al., 2013; Soodmand & Farahani, 2018; Thahir et al., 2019; Thomas & Kallarackal, 2020; Viholainen et al., 2014). When these studies were examined, it was noteworthy that the topics of the NoM and reflective thinking/views were generally handled separately, and no study was encountered in which the relationship between these two topics was investigated. Hence, instead of considering the mathematics teacher candidates' levels of reflective thinking and their views on the NoM as two independent variables, it is important to determine the relationship between them and to do practices accordingly. In this respect, it was aimed in the present study to identify the relationship between mathematics teacher candidates' levels of reflective thinking and their philosophical views on the NoM. The subproblems identified within the scope of the research are as follows:

- What are the secondary school mathematics teacher candidates' philosophical views on the NoM and their levels of reflective thinking?
- Is there a significant relationship between the subdimensions of the secondary school mathematics teacher candidates' philosophical views on the NoM and the subdimensions of their level of reflective thinking?
- Do the total mean scores of the secondary school mathematics teacher candidates' views on the NoM display significant correlations with the subdimensions of their reflective thinking levels?
- Do the subdimensions of the secondary school teacher candidates' levels of reflective thinking significantly predict their philosophical views on the NoM?
- Do the subdimensions of the secondary school teacher candidates' levels of reflective thinking display a significant difference with respect to the absolutists, mixed, and semi-experimentalist groups?

Method

Research Model

The relational survey model was used in the research in which the relationship between philosophical thinking about the NoM and reflective thinking was examined. The relational survey model is a research model that helps to understand the direction or degree of change between two or more variables (Karasar, 2022). With this model, it is tried to obtain

information about the direction and level of the relationship. In the descriptive research, the amount of change between two or more variables was tried to be determined under current conditions. In this direction, reflective thinking and its subdimensions of critical reflection, reflection, understanding and habit were considered as independent variables.

Study Group

The study group consists of 196 volunteer teacher candidates teaching in the mathematics education program of three different state universities in the spring term of the 2021-2022 academic year. Of the teacher candidates, 148 (75.5%) are females and 48 (24.5%) males. While forming the study group, attention was paid to the convenience of sampling and for this, non-random sampling type was preferred. In this methodology, which is used to avoid time, cost and labor loss, an understanding that includes accessible and applicable units is dominated (Büyüköztürk et al., 2014). In this respect, an economical and easily accessible process was taken into account in the creation of the determined sample. Among other reasons for the selection of the study group in this way, the presence of students who want to take part in the research voluntarily and the limitations of the application time can be cited.

Data Collection Tools

The Scale for Determining the Philosophical Thoughts on the NoM developed by Sanalan et al., (2013) was used to determine the philosophical thoughts of the pre-service teachers about the NoM. The scale consists of 25 items and four dimensions. The scale contains a total of 25 items and consists of four subdimensions. These dimensions of the 5-point Likert-type scale is daily life (DL), problem-solving (PS), the structure of mathematics (MS) and mathematical thinking (MT), respectively. There are 8 items in the DL dimension, 6 items in the PS dimension, 7 items in the MT dimension and 4 items in the MS dimension. Confirmatory factor analysis was performed to test the construct validity of the scale, and it was determined that the four-factor structure of the scale was compatible with the data set. Four factors explained 42.7% of the total variance. In addition, the total Cronbach Alpha internal consistency coefficient of the scale was tested and calculated as .85. The Cronbach Alpha reliability coefficients of the scale factors are respectively; DF .81; PS .65; MT was determined as .63 and the MS was determined as .70. Within the scope of this study, the total Cronbach's alpha internal consistency coefficient of the scale was calculated and found to be .88. According to the scores obtained from the scale, the groups and score ranges are between 25-75 points in the absolutist group, between 76-94 points in the mixed group and between 95-125 points in the semi-experimentalist group. In determining the group score ranges, the "z" scores were determined by calculating, since the data met the normality condition, and cut-off points were created accordingly. Accordingly, it can be evaluated that individuals with a z value less than -1.3 have an absolutist point of view, those with a z value between -1.3 and 0.2 have a mixed perspective, and those with a value of 0.2 and higher have a semi-empirical point of view. On the other hand, Kember et al. (2000) and adapted into Turkish by Başol and Evin-Gencel (2013), the Scale for Determining the Level of Reflective Thinking was used. The scale consists of a total of 16 items and four dimensions. The subdimensions of the 5-point Likert-type scale is critical reflection, reflection, habitual actions and understanding respectively. Each dimension has an equal number of items. Confirmatory factor analysis was performed to test the construct validity of the scale, and it was determined that the four-factor structure of the scale was compatible with the data set ($\chi 2/df=4.48$; RMSEA=.07; GFI=.93; AGFI=.90; NNFI=.92; CFI=.93). Four factors explained 53% of the total variance. In addition, the total Cronbach's Alpha internal consistency coefficient of the scale was tested and calculated as .77. The Cronbach Alpha reliability coefficients of the scale factors are respectively; critical reflection .68, reflection .72, understanding .69 and habitual actions .54. Within the scope of this research, the total Cronbach Alpha internal consistency coefficient of the scale was calculated and calculated as .78. After obtaining the necessary permissions regarding the measurement tools, it was applied by the researcher on a voluntary basis in accordance with the purpose of the study. The application of the scales was carried out in the digital environment, and the Google Forms application was used for this. The application time of each scale takes approximately 8-10 minutes.

Analysis of Data

In this study, arithmetic means and standard deviation values were taken into account in determining the philosophical thoughts and reflective thinking levels of prospective teachers about the NoM. The determined values were interpreted as very low between 1-1.79, low between 1.80-2.59, medium between 2.60-3.39, high between 3.40-4.19 and very high

between 4.20-5.00. Pearson Product Moments Correlation Coefficients technique was used to determine the relationship between philosophical thoughts about the NoM and reflective thinking levels. These coefficients were interpreted as low between .00-.29, medium between .30-.69 and high level between .70-1.00 (Büyüköztürk, 2019). In another step, effect of reflective thinking level on philosophical thoughts about the NoM was examined by multiple regression analysis. Before this regression analysis, there are a number of actions that need to be taken to satisfy the assumptions required. These procedures must be performed. In this context, it is recommended to examine the effects of extreme values, the agreement between the assumptions and the problem of multicollinearity (Çokluk et al., 2014). In the normality analysis performed before the difference analysis, it was determined that the skewness values ranged between -.78 and .32, and the kurtosis values ranged between -.48 and .65. In order for the assumption of normality to be met, the skewness and kurtosis values should be in the range of ± 1 (Büyüköztürk, 2019). Accordingly, it can be said that the data meet the normality assumption. In another step, the linear relationship between the variables was tested. In order to test the linear relationship between the variables, the scatter diagram was examined and it was determined that the variables extend to the right and are in a linear relationship. Another assumption of multiple regression analysis is to determine whether there is a multi-collinearity problem among the predictive variables. The multi-collinearity problem arises when there are strong relationships (r>.90 and above) among the independent variables (Çokluk et al., 2014). In order to test the multicollinearity problem, correlations between variance increase factors (VIF), tolerance values (TV), state index (CI) and independent variables are examined (Çokluk et al., 2014). Accordingly, if VIF values are greater than or equal to 10 (VIF≥10), TV values are less than or equal to .10 (TV≤.10), and CI values are greater than or equal to 30 (CI≥30) multicorrelation It means it has a problem (Çokluk et al., 2014). In this study, the highest correlation value between independent variables was .62. The VIF values of the variables are 1.02-1.56; CI values vary between 1.00-23.08 and TV values between .63-.97. According to these results, VIF, CI and TV values show that there is no multicollinearity problem between the independent variables. As a result, regression analysis was performed with 196 data sets in line with the findings. Finally, ANOVA test was applied to understand whether the reflective thinking levels of pre-service mathematics teachers differ significantly between absolutist, mixed and quasi-experimental groups. Since the variances were homogeneous, Hochberg's GT2 test, one of the post hoc multiple comparison tests, was used.

Findings

In this part of the study, the findings obtained within the scope of the study have been presented. In this context, firstly, descriptive analyses regarding the mathematics teacher candidates' philosophical views on the NoM and their levels of reflective thinking have been provided. Then, the relationships between the subdimensions of the philosophical views on the NoM and the subdimensions of reflective thinking, the relationships between the total mean score of the philosophical views on the NoM and the subdimensions of reflective thinking, and multiple regression analysis and ANOVA results that indicate the difference of the subdimensions of reflective thinking with respect to the absolutist, mixed, and semi-experimentalist groups have been presented. Accordingly, descriptive statistical findings involving the philosophical views on the NoM and reflective thinking skills are shown below:

Table 1. *Descriptive Statistics Regarding the Subdimensions of Assessment Tools*

Scales	Subdimensions	$\bar{X}$	Sd.	Skewness	Kurtosis	Total
Philosophical Views on the NoM	Daily Life	4.02	.57	-.41	.19	789.75
	Problem Solving	4.03	.53	-.14	-.48	790.50
	Mathematical Thinking	3.91	.54	-.41	.31	766.71
	Mathematics' Structure	4.03	.58	-.78	.32	790.00
Determining the Level of Reflective Thinking	Critical Reflection	3.50	.75	-.06	-.12	686.75
	Reflection	3.79	.64	-.15	-.05	743.25
	Understanding	3.77	.56	.02	-.18	739.25
	Habitual Actions	2.96	.63	-.19	.13	582.00

When Table 1 was examined, it was seen that among the philosophical views of the mathematics teacher candidates on the NoM, their views on DL ($\bar{X}$=4.02), PS ($\bar{X}$=4.03), MT ($\bar{X}$=3.91), and the MS ($\bar{X}$=4.03) were at a high level. On

the other hand, among the reflective thinking skills of the mathematics teacher candidates, it was determined that critical reflection ($\bar{X}$=3.50), reflection ($\bar{X}$=3.79), and understanding levels ($\bar{X}$=3.77) were at a high level, while habitual action levels ($\bar{X}$=2.96) were at a moderate level. When the total mean scores of the scales were considered, the teacher candidates' both philosophical view on the NoM ($\bar{X}$=3.99) and reflective thinking levels ($\bar{X}$=3.50) were at a high level. The findings regarding the relationship between the philosophical views on the NoM and the subdimensions of reflective thinking levels are presented below:

Table 2. *Relationship Values Between the Subdimensions of the Assessment Tools*

Variables		DL	PS	MT	MS	CR	RF	UN	HA
DL	r	1	.57**	.42**	.33**	.52**	.64**	.38**	-.07
	p	.	.00	.00	.00	.00	.00	.00	.31
PS	r		1	.60**	.46**	.40**	.63**	.27**	-.23**
	p		.	.00	.00	.00	.00	.00	.00
MT	r			1	.61**	.15*	.35**	.24**	-.29**
	p			.	.00	.03	.00	.00	.00
MS	r				1	.09	.23**	.11	-.27**
	p				.	.20	.00	.11	.00
CR	r					1	.51**	.33**	-.12
	p					.	.00	.00	.07
RF	r						1	.46**	-.09
	p						.	.00	.18
UN	r							1	.01
	p							.	.86
HA	r								1
	p								.

Note: DL: Daily Life, PS: Problem Solving, MT: Mathematical Thinking, MS: Mathematics' Structure, CR: Critical Reflection, RF: Reflection, UN: Understanding, HA: Habitual Actions **p<.01, *p<.05

When Table 2 was examined, it was observed that there were both positive and negative significant relationships between the philosophical views on the NoM and the subdimensions of reflective thinking. Accordingly, positive and significant relationships were found between DL and critical reflection (r=.52, p<.01), reflection (r=.64, p<.01), and understanding (r=.38, p<.01). Also, a positive and significant relationship was determined between PS and critical reflection (r=.40, p<.01), reflection (r=.63, p<.01), and understanding (r=.27, p<.01), and a negative relationship with habitual actions (r=-.23, p<.01). Finally, a positive and significant relationship was determined between MT and reflection (r=.23, p<.01), and a negative and significant relationship of MT with habitual actions (r=-.27, p<.01) was found. The findings obtained regarding the relationship between the mathematics teacher candidates total mean score on the philosophical views on the NoM and the subdimensions of reflective thinking levels are presented below:

Table 3. *The Relationship Between Total Mean Score on Philosophical Views on the NoM and the Subdimensions of Reflective Thinking*

Variables		NoM Total	CR	RF	UN	HA
NoM Total	r	1	.41**	.63**	.35**	-.26**
	p	.	.00	.00	.00	.00
CR	r		1	.51**	.33**	-.12
	p		.	.00	.00	.07
RF	r			1	.46**	-.09
	p			.	.00	.18
UN	r				1	.01
	p				.	.86
HA	r					1
	p					.

NoM: Nature of Mathematics, **p<.01

When Table 3 was analyzed, it was seen that there were positive and negative significant relationships between the total score on the philosophical views on the NoM and the subdimensions of reflective thinking levels. Accordingly, a positive and moderate relationship was found between the philosophical views on the NoM and critical reflection (r=.41, p<.01), reflection (r=.63, p<.01), and understanding (r=.35, p<.01), while a negative and low-level relationship was found with habitual actions (r=-.26, p<.01). The findings regarding whether the secondary school mathematics teacher candidates' reflective thinking skill levels predicted the philosophical views on the NoM, which is one of the subproblems of the study, are presented below:

Table 4. *Multiple Regression Analysis Results Between the Philosophical Views on the NoM and the Subdimensions of Reflective Thinking Levels*

Variables	*B*	S.E.	Std. β	t	*p*	F	R	R^2
Constant	2.63	.21	-	12.11*	.00	37.98	.66	.44
CR	.04	.03	.08	1.31	.19			
RF	.36	.04	.52	7.82*	.00			
UN	.05	.04	.07	1.22	.22			
HA	-.13	.03	-.20	-3.66*	.00			

**p<.01

When Table 4 was examined, it was seen that the variables regarding the subdimensions of critical thinking levels explained 44% of the variance in the philosophical views on the NoM (R^2=.44). It was also observed that the effect of the variables of reflection (t=7.82, p<.01) and habitual actions (t=-3.66, p<.01) on the philosophical views on the NoM was statistically significant. Accordingly, it was determined that with all other variables being constant, a one unit increase in the reflection dimension led to an increase of .36 unit in the philosophical views on the NoM, and that a one unit increase in the habitual actions dimension led to a decrease of .13 unit in habitual actions. It was also found that critical reflection (t=1.31, p>.05) and understanding (t=1.22, p>.05) subdimensions did not statistically predict the effect on the philosophical views on the NoM. The findings related to whether the subdimensions of the secondary school mathematics teacher candidates' reflective thinking levels differed according to the absolutist, mixed, and semi-experimentalist groups, which is another subproblem of the study, are presented below:

Table 5. *ANOVA Results of the Subdimensions of Reflective Thinking Levels According to Absolutist, Mixed, and Semi-experimentalist Groups*

Dimension	Groups	N	$\bar{X}$	Std.	Source of Variance	Sum of Squares	df	Mean Square	F	Differ
CR	Absolutist	23	3.13	.65	Between Groups	11.68	2	5.84	11.31*	3>1
	Mixed	98	3.36	.68	Within Groups	99.63	193	.51		3>2
	Semi-experimentalist	75	3.80	.77	Total	111.31	195			
RF	Absolutist	23	3.14	.58	Between Groups	28.01	2	14.00	52.02*	2>1
	Mixed	98	3.60	.50	Within Groups	51.95	193	.26		3>1
	Semi-experimentalist	75	4.23	.51	Total	79.96	195			3>2
UN	Absolutist	23	3.40	.55	Between Groups	6.50	2	3.25	11.04*	2>1
	Mixed	98	3.70	.52	Within Groups	56.84	193	.29		3>1
	Semi-experimentalist	75	3.97	.56	Total	63.34	195			3>2
HA	Absolutist	23	3.33	.53	Between Groups	4.24	2	2.12	5.46*	1>2
	Mixed	98	2.97	.60	Within Groups	74.94	193	.38		1>3
	Semi-experimentalist	75	2.84	.66	Total	79.18	195			

*p<.05

When Table 5 was analyzed, it was seen that 50% (*n*=98) of the mathematics teacher candidates had a mixed view of the NoM, 38.3% (*n*=75) had a semi-experimental perspective, and 11.7% (*n*=23) had an absolutist view. In addition, in terms of the subdimension of reflective thinking levels, a significant difference was found between the semi-experimentalist group and absolutist group in favor of the semi-experimentalist group ($F_{(2-193)}$=11.31, p<.05). In the subdimension of reflective thinking levels, significant differences were found between the mixed group and absolutist

group in favor of the mixed group, between the semi-experimentalist group and absolutist group in favor of the semi-experimentalist group, and between the semi-experimentalist group and mixed group in favor of the semi-experimentalist group ($F_{(2-193)}$=52.02, p<.05). In the subdimension of understanding, significant differences were determined between the mixed group and absolutist group in favor of the mixed group, between the semi-experimentalist group and absolutist group in favor of the semi-experimentalist group, and between the semi-experimentalist group and mixed group in favor of the semi-experimentalist group ($F_{(2-193)}$=11.04, p<.05). In the habitual actions subdimension, a significant difference was found between the absolutist group and the mixed and semi-experimentalist groups in favor of the absolutist group ($F_{(2-193)}$=5.46, p<.05).

Discussion and Conclusion

As a result of the study, it was determined that mathematics teacher candidates' philosophical views on the NoM were at a high level. It was also determined that the teacher candidates' views regarding all subdimensions such as DL, PS, MT, and the MS were at a high level. It is believed that this result obtained is positive in terms of the efficacy and applicability of teacher training programs. This is because it was determined in studies conducted that teachers' beliefs regarding the NoM guided their educational activities (Aktamış, 2012; Baydar & Bulut, 2002; Chrysostomoua & Philippou, 2010; Prediger, 2007). Hence, based on the finding obtained, it can be claimed that the mathematics teacher candidates will conduct their educational activities in line with structuralist approach rather than behaviorist approach. Similarly, in a study conducted, it was determined that teacher candidates had a student-centered approach regarding both the NoM and mathematics teaching (Dede & Uysal, 2012). In yet another study, it was found that teacher candidates' traditional views on the NoM were at a moderate level, while their non-traditional beliefs in this regard were at a high level (Duru & Göl, 2016).

Another result obtained in the present study was that 50% of the participating mathematics teacher candidates had a mixed view of the NoM, 38.3% a semi-experimentalist perspective, and 11.7% an absolutist point of view. Hence, the low percentage of mathematics teacher candidates in the absolutist group, who believe that mathematics only consists of a series of rules and operations, can be interpreted as a pleasing result. However, the fact that 50% of the teacher candidates were in the mixed group shows that they adopted the semi-experimentalist view in some cases and the absolutist perspective in some other cases. Therefore, it can be stated that the views of these mathematics teacher candidates regarding the NoM have not clarified yet, and that they are confused in this regard. In another study conducted, differently from the result obtained in the present study, it was determined that 49% of the teacher candidates adopted the semi-experimentalist view, 14% had the absolutist view, and 37% adopted both perspectives (Sanalan et al., 2013). The difference between the results is thought to have stemmed from the differences in the period when the studies were conducted and the study samples selected. While only mathematics teacher candidates were included in the sample of the present study, in the sample of the study conducted by Sanalan et al. (2013), science, mathematics, classroom, and social sciences teacher candidates were included. Besides, as the present study was conducted following the distance learning process in the pandemic period, it is thought that distance education affected the result.

Another result obtained in the present study was that the mathematics teacher candidates' reflective thinking levels were high. Similarly, in studies previously conducted, it was determined that teacher candidates (Duban & Yanpar-Yelken, 2010; Gözel & Toptaş, 2017; Keskinkılıç-Yumuşak, 2015) and teachers (Atılkan-Tuncer & Sapancı, 2021; Fırat-Durdukoca & Demir, 2012) had high levels of reflective thinking inclination. However, there are also studies which found the teacher candidates' reflective thinking levels as moderate (Erdogan & Şengül, 2014) or low (Rodgers, 2002). In addition, as a result of the present study, it was determined that the reflective thinking levels of mathematics teacher candidates were high in the subdimensions of critical reflection, reflection, and understanding. Based on this finding, it can be claimed that the mathematics teacher candidates had reflective thinking skills; in other words, they could question their past and current experiences, guide their future activities by inferring from their experiences, and produce new ideas. On the other hand, the mathematics teacher candidates' levels in the subdimension of habitual actions were found

to be at a moderate level. This may have resulted from their having received education in their previous life based on repetition and reinforcement. It is thought that as they were made to solve similar problems repetitively, the teacher candidates responded to these examples without thinking and therefore they formed a habit.

When the relationships between the philosophical views on the NoM and the subdimensions of reflective thinking were examined, it was determined that there were positive relationships between the subdimensions of DF, PS, and MT and the subdimensions of critical reflection, reflection, and understanding. When the literature was reviewed, it was seen that reflective thinking was reported to be associated with PS steps. Reflective thinking has been defined as analyzing the knowledge and restructuring it as well as the process of establishing and solving the problem. In addition, the purpose of reflective thinking has been expressed as understanding a situation or a problem and solving it in a better way (Schon, 1987). Also, it has been determined that reflective thinking skill is a significant predictor of PS success (Kızılkaya, 2009). Individuals are expected to reflect the experiences they have gained in the PS process onto the DF as well. Finally, it was determined in the present study that the subdimension of habitual actions was negatively correlated with the dimensions of PS, MT, and the MS. Habitual actions have been defined as actions that are started to be performed unconsciously and without thinking as a result of repetitions (Mezirow, 1991). Therefore, this result obtained in the dimension of habitual actions can be said to be an expected result, as thinking and questioning were not performed.

In the present study, it was concluded that there was a positive and moderate relationship between the subdimensions of the mathematics teacher candidates' reflective thinking levels and their philosophical views on the NoM. Besides, it was determined that the variables related to the subdimensions of the mathematics teacher candidates reflective thinking levels explained 44% of the variance in their philosophical views on the NoM. Accordingly, it can be stated that as the levels of the mathematics teacher candidates' reflective thinking increase, the levels of their philosophical views on the NoM will also increase. Considering the subdimensions, it was determined that the subdimensions of reflection and habitual actions statistically significantly predicted the mathematics teacher candidates' philosophical views on the NoM. In fact, it was observed that a one unit increase in the reflection subdimension led to an increase of .36 unit in philosophical views on the NoM, and that a one unit increase in the subdimension of habitual actions caused a decrease of .13 unit in the philosophical views on the NoM. Hence, based on this, it can be inferred that in order to improve individuals' philosophical views on the NoM, it is necessary to provide education that involves questioning and discussing rather than a training based on memorization and habits. On the other hand, as a result of the study, it was determined that the subdimensions of critical reflection and understanding did not statistically significantly predict the teacher candidates' philosophical views on the NoM. It has been stated that since a change should be experienced in the individual's perspective, especially at the level of critical reflection, this is very unlikely and not experienced much (Kember et al., 2000). This feature of critical reflection level can be considered the reason for this result. In addition, it has been stated that the subdimension of understanding in the scale used in the present study is limited to the comprehension step in Bloom's classification of cognitive domain learning (Başol & Evin-Gencel, 2013). Therefore, it can be claimed that education provided at the level of comprehension is not enough to improve individuals' philosophical views on the NoM. In order to improve this view, it is believed that studies aimed at analysis, synthesis, and evaluation steps should be conducted.

Finally, as a result of the study, it was determined that there was a statistically significant difference between the semi-experimentalist group and the mixed and absolutist groups in favor of the semi-experimentalist group in terms of the secondary school mathematics teacher candidates' critical reflection, reflection, and understanding skills. Moreover, regarding the secondary school mathematics teacher candidates' reflection and understanding skills, a statistically significant difference was found between the mixed group and the absolutist group in favor of the mixed group. Accordingly, it can be claimed that the critical reflection, reflection, and understanding skills of the mathematics teacher candidates in the semi-experimentalist group are at a higher level. Literature review revealed that semi-experimentalists argue that mathematical knowledge is an endeavor of human product that is falsifiable, applicable, and is fed on practical experiences, develops, and changes (Baki, 2008; Handal, 2003). In addition, as a result of the study, it was concluded that regarding the subdimension of habitual actions of the mathematics teacher candidates, a statistically significant

difference between the absolutist group and the mixed and semi-experimentalist groups was determined in favor of the absolutist group. Similarly, it has been stated that in the absolutist perspective, mathematics consists of a series of rules that need to be memorized and arithmetic calculations (Steinbring 1998; Van de Walle, 2004). Furthermore, it has been indicated that the absolutists argue that mathematical knowledge is composed of definite and unchanging truths, and that mathematical truths that are transferred can be learned through memorization by repetition (Baki, 2008; Işıksal, 2007). Hence, it can be claimed that as the subdimension of habitual actions is defined as actions that are performed without thinking as a result of repetitions, it is compatible with the absolutist view.

Recommendations

In line with the results obtained in the study, it was seen that the mathematics teacher candidates had the absolutist view in some cases and the semi-experimentalist perspective in other cases; in other words, they experienced indecision. Hence, it is important to examine in detail in what cases the teacher candidates experience indecision and the reasons for this situation. In addition, in the study, it was determined that the reflective thinking skills of the mathematics teacher candidates improved their philosophical views on the NoM. In this context, it can be recommended that activities that will improve the teacher candidates' reflective thinking skills should be organized. Moreover, in order for the teacher candidates' views on the NoM to develop, discussions on the relationship of mathematics with DF and other disciplines and the structure and importance of MT should be included. It is also believed that it would be effective to do applications related to the changeability of mathematical knowledge, i.e., getting the teacher candidates to question in what situations the theories are verified and under what conditions they are invalid. As a result of the study, it was determined that the mathematics teacher candidates had a high level of reflective thinking and philosophical views on the NoM. However, as the study data were collected through scales based on self-report and self-perception, if it is examined whether the teacher candidates reflected these skills onto their in-class practices through mixed methods that include observation and interview, a contribution can be made to the literature. When the literature was reviewed, no study that examined the relationship between teacher candidates' reflective thinking levels and their philosophical views on the NoM was encountered. Therefore, conducting similar studies with different samples is considered important in terms of comparing the results obtained.

Limitations of the Study

The data of this study is limited to the answers of 196 volunteer teacher candidates teaching in mathematics education programs of three different state universities in the spring semester of the 2021-2022 academic year. Another limitation of the study is that volunteer students were included in the study. Therefore, the opinions of students who did not participate in the study or did not want to participate may differ.

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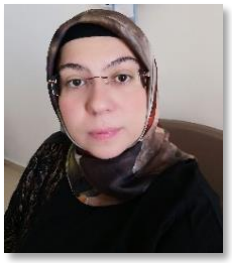

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Research Article

Gifted students and teachers' perceptions of distance education process in the COVID-19 pandemic

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Abstract

The development of educational technologies has contributed positively to learning and teaching process by diversifying educational environments and activities. With the development of distance education programs, it has also become possible to conduct online and offline courses through distance education. Due to the measures implemented during the COVID-19 pandemic that emerged in the world and in our country, face-to-face education could not be provided at schools, and teachers and students benefited from distance education. The purpose of this study is to investigate distance education process of gifted students and their teachers at the Science and Art Center (SAC) during the COVID-19 pandemic. A case study method which is one of the qualitative research methods was used in the research, and data were collected through interview questions. The sample of the research consists of teachers and students at Halil İncekara Science and Art Center in Nevşehir, Turkiye. Data were collected with a semi-structured interview and analyzed descriptively. According to the results of the research, the advantage of distance education process is an increase in the efficiency of using time, space, transportation, and technology. On the other hand, the disadvantages of distance education are listed as limited socialization, problems in activities that require practice, lack of technological infrastructure and hardware, problems in the Internet connection, difficulty in understanding the subjects, an increase in communication problems and lack of peer interaction.

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Introduction

The 21st century has been a century in which the impact of globalization has been felt intensely all over the world. A change or development in any part of the world affects the whole world in a short time with the effect of globalization. In this sense, some epidemics in the world in recent years pose a serious threat to human health. Yelboğa & Aslan (2020) state that societies get closer to each other and are affected from each other due to travels, ease of transportation, Olympics, international student exchange programs, wide commercial and industrial relations among countries.

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Topkaya (2016) states that many new diseases such as swine flu, Zika virus, Crimean-Congo haemorrhagic fever, and Ebola epidemic which have been seen recently negatively affect human health and life. Cihanoğlu Gülen (2018), on the other hand, states that epidemic diseases such as swine flu (H1N1), avian flu (H5N1) and AIDS have turned into a global risk, and they cause serious health problems with the effect of globalization. As a matter of fact, the COVID-19 pandemic that has been experienced in the world since the end of 2019 has left serious damage on personal and public health. Although its effect has decreased, the death cases from this disease continue and it still poses a threat to humanity.

The Coronavirus Disease-2019 (COVID-19) first appeared in China at the end of 2019, spread rapidly all over the world and affected people's lives negatively. In our country, the first case was seen in March 2020. The World Health Organization declared COVID-19 as a pandemic in March 2020 and defined it as a fatal disease that can be infected quickly and easily (Aslan, 2020; Bao, Sun, Meng, Shi, & Lu, 2020; Xu, Yu, Zhang, Luo, & Liu, 2020; Ministry of Health, 2020). COVID-19 has affected human life in many areas such as health, education, economy, tourism, etc. It has caused negative changes in family interactions and interpersonal communication, and limited people's lives to a large extent with its destructive effects (Balaban & Hanbay Tiryaki, 2021; Balcı, 2020; Cavlak, 2020; Çelik & Çak, 2021; Işık & Bahat, 2021; Önder, 2022). This pandemic causes a lack of motivation, psychological pressure, fear and anxiety with the effect of psycho-social problems. It still continues to threaten the humanity of the world spiritually, physically and socially (Ahorsu Lin, Imani, Safari, Griffiths, & Pakpour, 2020; Budak & Korkmaz, 2020; Duan & Zhu, 2020; Metin, Gürbey & Çevik, 2021; Olcay & Sakalli, 2022).

The COVID-19 pandemic process has caused psycho-social problems such as anxiety and fear among people due to the rapid transmission of the disease and death risk (Lin, 2020), many people have had difficulty in controlling their motivation and performance due to this excessive anxiety they experience and they have been affected mentally in the process (Boyraz, Güçlü, & İnan, 2021). If the fear of this disease continues among people, its damage to people may increase (Huang, Han, Luo, Ren, & Zhou, 2020). As a result of the long isolation during the pandemic process, there have been problems within families, and teachers and students have experienced negative emotions during the education process due to reasons such as fear of getting sick and worry about losing their relatives (Kavuk & Demirtaş, 2021). Even if the pandemic ends, it is predicted that its effects will continue in all areas of life, especially in education (Işık & Bahat, 2021). The biggest disaster of 2020 is undoubtedly the COVID-19 virus outbreak. In this process, the health system in many countries collapsed and the whole world experienced a nightmare. In order to prevent the transmission of this virus, all collective activities, especially education and training, were stopped and schools were closed gradually. In order to continue education and training activities, distance education was started, and each country implemented education practices within its own means (Yaman, 2021).

Before pandemics, distance education started with written sources such as letters and newspapers, and later it was implemented with tools such as television, computer and internet with the development of technology (Özbay, 2015). In this development process, some stages have been passed such as education via mail, television and radio broadcasting, open universities, education via teleconference, and education via internet technology (Göksel, 2015). In the last two decades, distance education and information technologies have been actively used, and online and offline technological developments have been used by the society for the benefit of people (Bayrak, Aydemir, & Karaman, 2017). Distance education is named as educational activities carried out by drawing on the advantages of technology (Özdemir, Çakıroğlu, Bayılmış, & Ekiz, 2004). It is an independent form of education in which course-specific materials are used and teachers and students are in different places far from each other (Uşun, 2006). In this context, it can be said that distance education is an educational activity that supports learning-teaching activities such as reinforcing by rewatching from the recording and lifelong learning, and where the learner and teacher do not come together face-to-face.

It is seen that distance education is necessary in order not to interrupt education and training in negative conditions such as epidemic diseases etc. Distance education can also provide some convenience in terms of content, space, and time. Thanks to the rapidly developing information and communication technologies, the spread of the Internet, the development of video and audio online education applications and distance education applications have become widespread (Kırık, 2014). Umurhan (2014) states that distance education has made it easier to reach inaccessible

individuals and diversified education and training activities. In distance education process, communication takes place with interactive technological tools since students, teachers and learning resources are independent of time and space (Balaman, 2018). According to Wallace (2009), distance education has some difficulties and risks for teachers and students who are accustomed to the face-to-face learning environment in the classroom. Among these problems, technological problems, environmental problems, software usability problem, decreased nonverbal communication can be given as some examples. For that reason, it is important to put more emphasis on the subjects being taught, to use intonation, to write, to manage time and technology in distance education. In addition, teachers and students should take courses on independent teaching and learning and be open to innovative thinking.

During the COVID-19 pandemic, learning losses were tried to be minimized, and all levels of education, from pre-school to higher education, included in the education process through distance education. In this process, distance education was carried out in Science and Art Centres (SACs) which are educational institutions where gifted students study.

In the regulation of special education services of the Ministry of National Education (MoNE), Science and Art Centre is defined as the institution which was founded to provide supportive education services to students who continue formal education institutions and who have special talents in mental, visual, artistic or musical abilities in order to improve their skills and enable them to use their capacities at the highest level. In the same regulation, special talented individual is defined as "an individual who learns faster than their peers, who is ahead in creativity, art, leadership capacity, who has special academic abilities, who can understand abstract ideas, who likes to act independently in his/her interests, and performs at a high level" (MNE, 2020, p. 1-2).

SACs aim to make gifted students aware of their talents and to provide them with an appropriate educational environment for the development of these talents. Programs are prepared and carried out in order to provide students with advanced knowledge and skills in order to conduct research and examination individually or in groups, to produce designs and models with new and original ideas according to their abilities under the guidance of their advisor teachers. Education and training activities to be held in SACs can be planned on weekdays and/or at weekends out of student's formal education hours (MNE, 2019).

Some problems have been experienced in the field of education during the COVID-19 pandemic process like the problems experienced in every sphere of life. Due to this pandemic in the world and in our country, some quarantine measures were taken. Within the scope of quarantine measures, distance education was commenced, obeying the mask-social distance-hygiene rules. In this process, teachers and students were primarily affected and they faced many positive or negative situations. In distance education process, the burden of gifted students, especially studying at the SACs, was more difficult than other students. The reason for this difficulty is that gifted students participated in distance education courses carried out both in their own formal schools and in SACs Since there are no separate course hours for SACs in distance education plan made by the MNE, the lessons of the centre overlapped with the lessons of the schools where students continue their formal education. This situation created a problem for gifted students and SACs had to make their own course plans for distance education.

In the current study, it is aimed to evaluate distance education process which was carried out due to the COVID-19 pandemic via gifted students and teachers' views at SACs. To this end, the advantages and disadvantages of distance education process, the problems experienced by teachers, the problems experienced by students, the technological problems and the problems caused by parents were tried to be determined. In the research, the notions such as SACs, gifted students and distance education were reviewed based on the literature, interviews, one of the qualitative research methods, were used, and the data were examined and tried to be presented in detail. It is hoped that the research will contribute to the literature, and students, teachers at SACs and students' parents in terms of evaluating the situations experienced in distance education process, revealing the problems, and suggesting solutions.

When the literature is examined, some studies investigating distance education process due to the COVID-19 pandemic at schools affiliated to the Ministry of National Education are as follows (Akdal & Yazicioglu, 2021; Apalı & Çulcu, 2021; Aykar & Yurdakal, 2021; Başaran, Doğan, Karaoğlu & Şahin, 2020; Can, 2020; Karakuş, Esendemir,

Ucuzsatar & Karacaoğlu, 2021; Karatay, Kaya & Başer, 2021; İnci Kuzu, 2020; Özdoğan & Berkant, 2020; Sığın, 2020; Ülger, 2021; Yılmaz Altuntaş, Başaran, Özeke & Yılmaz, 2020).

When the literature is examined, it is seen that there are few studies (Türksoy & Karabulut, 2020; Çıldır, 2020; Ceylan & Umdu Topsakal, 2021) evaluating the distance education process of gifted students studying at the SACs due to the COVID-19 outbreak. In their study in which they revealed the perceptions of gifted students on distance education based on the views of their parents, Türksoy & Karabulut (2020) found that the effect of pandemic on students' education process was negative, ineffective and insufficient. In the study conducted by Çıldır (2020), she identified the difficulties encountered in distance mathematics education of gifted students studying at secondary school. Ceylan & Umdu Topsakal (2021), on the other hand, discussed the views of teachers and gifted students regarding the application of differentiated science program in the COVID-19 distance education process.

When the studies are examined, no research has been found that reveals the holistic evaluation of the distance education process according to the views of teachers and gifted students in the COVID-19 pandemic process concerning SACs. This research is considered important as it is an original study.

Problem of Study

In this study, it is aimed to determine the perceptions of gifted students and their teachers about distance education applications, which have become a necessity during the COVID-19 pandemic period. The problem of the research is;

- How are the perceptions of gifted students and their teachers towards distance education during the pandemic period?

Sub-problems of the study are below;

- How are the opinions of gifted students and their teachers about **advantages and disadvantages** of distance education during the COVID-19 pandemic period?
- How are the opinions of gifted students and their teachers about **encountered problems** of distance education during the COVID-19 pandemic period?

Method

Research Model

In this study, case study, which is one of the qualitative research methods, was used. Qualitative research method was preferred in the research in order to better understand the emotions, thoughts and feelings of the participants in the process (Ekiz, 2003). Interview, observation and document analysis can be given as some examples of qualitative data collection methods. Qualitative research is the process of revealing perceptions and events in their natural environment in a holistic and realistic way (Yıldırım & Şimşek, 2013).

The experiences of the teachers and students participating in the research regarding the case were tried to be examined in detail. The case study is a method to examine a person, an environment, an event and a document in detail (Uzuner, 1999). The case study method is used when individuals, institutions and decision makers desire to explain a case that is thought to be complex by obtaining detailed information (Akar, 2016). In addition, in the case study approach, it is aimed to collect multiple data and make an in-depth analysis to collect systematic information about a limited situation or a system (Chmiliar, 2010). As a result, case study allows the researcher to systematically collect and understand information about an individual, a group, a social structure, an event or a phenomenon (Berg, 2001).

Study Group

The sample in the research consists of 14 teachers working in Nevşehir Halil İncekara Science and Art Center in 2021-2022 academic year, and 70 students who are registered and studying here. Teachers and students answered the interview questions in the study on a voluntary basis. Demographic information of the subjects is presented in Table 1.

Table 1. Demographic Information of the Teachers Participating in the Study

Teachers		**n**	**%**
Gender	Male	10	71.4
	Female	4	28.6
Graduation Status	Bachelor's Degree	5	35.8
	Master's Degree	9	64.2
Years of Experience	1-5	-	-
	6-10	1	7.1
	11-15	4	28.6
	16-20	5	35.7
	21-25	3	21.5
	26-30	1	7.1
	30 and over	-	-
Teacher	Total	14	100

In Table 1, when the gender of the teachers among the subjects is examined, it is seen that all 14 teachers, 4 female teachers (28.6%) and 10 male teachers (71.4%), participated in the research. When the graduation status of the teachers is examined, 5 teachers (35.8%) have bachelor's degree and 9 teachers (64.2%) have master's degree. It is seen that 64.2% of teachers at Science and Art Center (BİLSEM) have completed their postgraduate education. This can be interpreted as good in terms of quality. When the years of experience of the teachers are examined, It is seen that 1 teacher has 6-10 years (7.1%), 4 teachers have 11-15 years (28.6%), 5 teachers have 16-20 years (35.7%), 3 teachers have 21-25 years (21.5%), and 1 teacher has 26-30 years of experience (7.1%).

Table 2. Demographic Information of the Students Participating in the Study

Students		**n**	**%**
Gender	Male	30	42.9
	Female	40	57.1
Age	8	3	4.3
	9	4	5.7
	10	25	35.7
	11	21	30
	12	10	14.3
	13	7	10
Student	Total	70	100

In Table 2, when the gender of the students participating in the study is examined, there are 30 male (42.9%) and 40 female (57.1%) students. The ages of the students range from 8-13. When the age distribution of the students is examined, 3 students are at the age of 8 (4.3%), 4 students are at the age of 9 (5.7%), 25 students are at the age of 10 (35.7%), 21 students are at the age of 11 (30%), 10 students are at the age of 12 (14.3%) and 7 students are at the age of 13 (10%).

Data Collection Tools

In the study, a semi-structured interview form consisting of 6 questions was used to obtain the data. Interview, which is a qualitative research method, is a method used to reveal people's perspectives on facts and events, their feelings, thoughts, experiences, values and perceptions (Yıldırım & Şimşek, 2013). It includes the questions and topics that are planned to be asked to the individuals during the interview (Patton, 2005). The semi-structured interview method, on the other hand, does not have as strict rules as the structured interview method and is not as flexible as the unstructured interview method. Therefore, it allows flexibility for the researcher (Karasar, 2007; Yıldırım & Şimşek, 2013).

While developing the data collection tool, the relevant literature was reviewed, and the necessary resources were collected. While preparing the interview questions to be used in the research, the views of three teachers working at the SACs and an academician who is an expert in the subject area at university were taken in order to ensure the content validity and reliability, the relevant arrangements were made and the interview questions were finalized and the actual interviews were conducted. Later, the questions in the interview form were sent to the scientific research and publication ethics committee of the university, and the ethics committee permission was obtained with the number of meetings and decisions 2021.09.343.

Analysis of Data

The research was carried out in the period when distance education was ended and face-to-face education was started, thus, the lapse of time was prevented. Data were collected during the period when the distance education process due to the COVID-19 pandemic would be evaluated as a whole, and when the participants could remember the whole process. In the study, data were collected on a voluntary basis and the consent of the participants was granted. Convenient time for the teachers and the students who want to participate in the research were determined. Before the interviews, some explanations were given to the participants. Accordingly, it was stated in the interview form that the names of the participants would be kept confidential and coding would be used for teachers (T1,T2,... T14), for students (S1,S2, ... S70), and the privacy rights of the participants would be respected. It was explained to the participants that permissions were obtained from the relevant ethics committee for the study and that data would not be used anywhere other than the study. Efforts were made to create an environment in which the participants could respond comfortably, and care was taken not to influence the participants in the presence of the researcher.

The researcher met the participating teachers and students at the SACs outside of class hours when they were convenient, and interviews were held. Individual interviews with teachers and students took approximately 4 weeks and lasted an average of 20-30 minutes. During the interviews, the views expressed by the participants were written on the interview form prepared by the researcher in order to prevent data loss while the participants were talking. Before and during the interview, some explanations were made in order to remove the ambiguity when the participants needed regarding the questions in the interview form (Büyüköztürk, 2012), and questions were asked at the end so that they could answer the questions in more detail by making the necessary explanations. In semi-structured interviews, additional questions can be asked to deepen the participants' views that are not clear enough (Ersoy, 2014; Yıldırım & Şimşek, 2013). At the end of the interview, the credibility of the data was ensured by asking the participants to check their answers (Yıldırım & Şimşek, 2013).

In the study, descriptive analysis was used in the analysis of the data collected in order to reveal the existing case. The findings of the research were given in tables, and relevant explanations were made under each table, and they were interpreted and discussed in the results section. The descriptive approach is to explain, define, evaluate the investigated case in detail, and reveal the relationships among events or cases (Çepni, 2012). In descriptive approach, participants are asked to explain in detail about the research environment (Cresswell, 2005).

Descriptive analysis is carried out in certain stages: A framework is created for the analysis of the data obtained from the interview questions in the research. Then data are processed, organized and defined. Where necessary, it is supported by direct quotations. Finally, the findings are interpreted, and the cause-effect relationship is explained (Yıldırım & Şimşek, 2013). While the data obtained from the teachers and students through the interview questions were analyzed with descriptive analysis, importance was given to confidentiality by using coding for teachers (between T1-T14) and for students (between S1-S70), and reliability was ensured by including direct quotations of the participants.

Findings

The views of teachers and students on the advantages of distance education during the COVID-19 pandemic period are given in Table 3.

Table 3. Views of Teachers and Students on the Advantages of Distance Education

Teacher	f	%	Student	f	%
-Increase in competence in technology usage	5	35.7	-There is no advantage	39	55.7
-Elimination of the space problem	5	35.7	-Saving time	10	14.3
-Protection from the pandemic	4	28.6	-Accessibility	7	10
-Elimination of time problem	4	28.6	-Protection from diseases	6	8.6
-Elimination of transportation problem	3	21.4	-Increase in technology availability	4	5.7
-Increase in the attendance rate of students with physical disabilities	1	7.1	-Increase in the rate of course attendance	1	1.4
-Increase in the number of students attending the course	1	7.1	-Less homework	1	1.4
			- Less writing	1	1.4
			- Not Wearing a Mask	1	1.4

When the views of the teachers participating in the research on the advantages of distance education are examined in Table 3; It is seen that there are 5 teachers (35.7%) stating that there was an increase in competence in their technology usage; 5 teachers (35.7%) expressing the elimination of the space problem; 4 teachers (28.6%) stating that it ensured the protection from the pandemic; 4 teachers (28.6%) stating that the time problem was eliminated; 3 teachers (21.4%) stating that the transportation problem was eliminated; 1 teacher (7.1%) expressing an increase in the attendance of students with physical disabilities and 1 teacher (7.1%) indicating an increase in the number of students attending the course. Some teachers' direct statements regarding the advantages of distance education are given below:

T3: "Distance education has some advantages. The problem of place and time has been reduced. It provides the opportunity to give education anywhere and at any time of the day. It provides equality of opportunity in education by making technological opportunities available to everyone".

T5: "It provided advantages in terms of an increase in teachers' ability to use technology, their competence in preparing and using digital materials, and accessing course content on the Internet".

In Table 3, when the views of the students participating in the study on the advantages of distance education are examined, 39 students (55.7%) stated that there is no advantage of distance education. The number of students who think that distance education has advantageous aspects is 31 (44.3%). 10 students stated that (14.3%) it saved time, 7 students (10%) stated that it provided accessibility, 6 students (8.6%) stated that they were protected from diseases; and 4 students (5.7%) stated that there was an increase in technology availability. On the other hand, 1 student (1.4%) stated that it increased the rate of course attendance, 1 student (1.4%) stated that there was less homework, 1 student (1.4%) stated that they wrote less, and 1 student (1.4%) stated that they did not have to wear a mask. Some students' direct statements regarding the advantages of distance education are given below:

S48: "I don't have to come to school by car".

S58: "I have more time left after distance education. I can read books and take tests whenever I want".

S65: "I can participate in distance education from anywhere".

S66: "I do not think that distance education has advantages".

The views of teachers and students regarding the disadvantages of distance education during the COVID-19 pandemic are given in Table 4:

Table 4. Views of Teachers and Students on the Disadvantages of Distance Education

Teacher	f	%	Student	f	%
-Problems in activities that require practice	6	42.8	-Having difficulty in understanding the subjects	18	25.7
-Lack of technological infrastructure	6	42.8	-Limited socialization	17	24.2
-Increase in communication problems	4	28.5	-Troubles caused by internet connection problems	14	20
-Increase in physical problems	2	14.2	-Increase in health problems	14	20
-Overlapping the student's own school lessons and BİLSEM's lessons	2	14.2	-There is no disadvantage	11	15.7
-Limited assessment and evaluation	1	7.1	-Limited assessment and evaluation	1	1.4

According to the views of the teachers participating in the study on the disadvantages of distance education in Table 4, 6 teachers stated that the problems occured mostly in activities that require practice (42.8%), 6 teachers stated that the technological infrastructure was insufficient (42.8%), 4 teachers stated that it increased communication problems (28.5%). On the other hand, it is seen that 2 teachers (14.2%) stated that there was an increase in physical problems, 2 teachers (14.2%) stated that students' own school lessons overlapped with the school lessons of BİLSEM, and 1 teacher (7.1%) stated that assessment and evaluation were limited. Some teachers' direct statements regarding the disadvantages of distance education are given below.

T2: "Distance education has some disadvantages. Some problems occurred in assessment and evaluation. It limited applied education. The lack of infrastructure and technology caused problems. Connection problems, not being able to communicate well, etc".

T5: "Accessibility is difficult for students in regions where the technical infrastructure is insufficient. This has brought about inequality of opportunity. Another disadvantage is that the programs used in distance education are not reliable. In addition, students and teachers who spend long hours in front of the screen have psychological and physiological problems."

T6: "The fact that some of the students could not access to computers, internet, etc. created a problem. It caused communication problems. Problems were encountered mostly in activities that required practice".

When the views of the students participating in the research on the disadvantages of distance education are examined in Table 4; 11 students (15.7%) stated that distance education is not disadvantageous while 59 students (84.2%) mentioned some disadvantages of distance education. Accordingly, as for the disadvantages of distance education, students listed the following factors: Having difficulty in understanding the subjects (18 students, 25.7%); limited socialization (17 students, 24.2%); excessive troubles caused by internet connection problems (14 students, 20%); increase in health problems (14 students, 20%); and limited assessment and evaluation (1 student, 1.4%). Some students' direct statements regarding the disadvantages of distance education are given below:

S36: "We could not meet our friends. I had the Internet connection problems during the lessons".

S62: "My eyes are tired, I miss my friends and my teacher".

S66: "I had difficulty in understanding the subjects and the lessons were not beneficial".

S67: "I cannot play games with my friends. Also, I cannot fully understand the lessons".

Views on the problems experienced between teachers and students in distance education during the COVID-19 pandemic are given in Table 5:

Table 5. Views on the Problems Between Teachers and Students in Distance Education

Teacher	f	%	Student	f	%
-Decrease in the rate of course attendance	2	14.2	-I had no problems	60	85.7
-Not attending the course on time	2	14.2	- Inability to express yourself	5	7.1
-Failure to conduct applied courses	2	14.2	-Connection-related problems	5	7.1
-Disciplinary problems	1	7.1			
-Communication problems	1	7.1			
-No problems	6	42.8			

When the views of the teachers participating in the research on the problems experienced between teachers and students in distance education are examined in Table 5; 6 teachers (42.8%) stated that they did not have any problems, and 8 teachers (57.2%) stated that they had problems. Two of the teachers (14.2%) stated that there was a decrease in the number of students attending the courses, 2 of them (14.2%) stated that students did not attend the courses on time, 2 of them (14.2%) stated that students could not receive applied courses, 1 of them (7.1 %) stated that they had disciplinary problems, and 1 of them (7.1%) stated that they had communication problems. The direct statements of some teachers regarding the problems experienced between teachers and students in distance education are given below:

T6: "The student who did not want to attend the course left the online class at any time and gave the excuse that he had a connection problem in order not to answer the questions".

T10: "I did not have any problems with my students. Although the course hours are the same as the face-to-face course hours, I think the online course hours are not enough".

T11: "I didn't have any problems with my students in general, but the rate of course attendance was low".

When the views of the students participating in the research on the problems experienced between teachers and students in distance education are examined in Table 5, 60 students (85.7%) who participated in the research stated that they did not have any problems in the distance education process while 10 students (14.3) stated that they had problems. 5 of the students (7.1%) stated that they were unable to express themselves, and 5 of them (7.1%) stated that they had problems with the Internet connection. The direct statements of some students regarding the problems experienced between teachers and students in distance education are given below:

S26: "Due to my teacher's internet problem, sometimes his voice and image disappeared".

S28: "I had a problem with my teacher. Because when I raise my hand and ask for the right to speak, he gives the right to speak to my friend who is not interested in the lesson instead of me. In some special cases, when I turn off my camera, my teacher perceives this as an excuse".

S30: "My teacher did not give as much right to speak in distance education as in face-to-face education".

The views of teachers and students regarding the technological problems experienced in distance education during the COVID-19 pandemic period are given in Table 6:

Table 6. *Views of Teachers and Students on Technological Problems in Distance Education*

Teacher	f	%	Student	f	%
-Internet connection problems	7	50	-Internet connection-related problems	28	40
-Lack of technological equipment	7	50	-I had no problems	22	31.4
			-Lack of computer hardware	12	17.1
			-Insufficient internet capacity	8	11.4

When we examine the views of the teachers participating in the research on the technological problems experienced in distance education in Table 6; 7 teachers (50%) stated that they had internet connection problems and 7 teachers (50%) stated that they had a lack of technological equipment. The direct statements of some teachers regarding the technological problems experienced in distance education are given below:

T1: "Due to the heavy use of the Internet, connection problems occurred from time to time. There was a lack of technological equipment for several students or teachers".

T5: "I had problems such as disconnecting from the Internet and not being able to connect again due to the software program we used".

T11: "I would definitely say that we had problems. Sometimes our internet quota was not enough. Sometimes the number of computers at home was not enough for those who could benefit from distance education. We had to wait for each other, or we had to connect the Internet with mobile phone. I had health problems due to excessive computer use".

When the views of the students participating in the research on the technological problems experienced in the distance education process are examined in Table 6, 22 students (31.4%) stated that they did not experience technological problems in distance education, while 48 students (68.6%) stated that they had problems. 28 students (40%) stated that they had problems with the Internet connection, 12 students (17.1%) stated that they had problems such as lack of computer hardware and 8 students (11.4%) stated that they had problems such as insufficient internet capacity. Some students' direct statements in terms of the technological problems experienced in distance education are given below:

S1: "I had problems. The fact that the mobile phone sometimes had poor reception and the Internet connection at our home was established late posed big problems. There was not enough technological equipment at home and it was not enough for us".

S12: "I had connection problems many times during the online lessons. I had difficulty in understanding the subjects".

S21: "The online sessions were sometimes frozen and I could not understand the lesson. I waited half an hour to attend online classes via Zoom and I was late for the class".

S20: "Yes, I had problems. At the time the lesson started, sometimes my computer did not turn on and I missed the lesson".

The views of teachers and students regarding the problems caused by parents in distance education during the COVID-19 pandemic are given in Table 7:

Table 7. Views of Teachers and Students on the Problems Caused by Parents in Distance Education

Teacher	**f**	**%**	**Student**	**f**	**%**
-Parent's interference in the lesson	5	35.7	-I had no problems	57	81.4
-Lack of communication	4	28.5	-Not providing a suitable environment	6	8.5
-I had no problems	5	35.7	-Excessive care	4	5.7
			-Excessive technology usage	3	4.2

When the views of the teachers participating in the research on the problems they experienced with students' parents in distance education are examined, there are 5 teachers (35.7%) who stated that they did not have problems with students' parents, whereas there are 9 teachers (64.3%) who had problems. 5 of the teachers (35.7%) stated that the parents interfered in the lesson (35.7%), while 4 teachers (28.5%) stated that they had a lack of communication with the

parents. The direct statements of some teachers regarding the problems caused by parents in distance education are given below:

T1: "Parents generally attended the lessons as spectators in the background. In this case, they became aware of every positive and negative event in the lessons, and they influenced the students".

T5: "There were times that the parents interfered in the students during distance education, albeit a little".

T6: "Parents wanted to interfere in the lessons. They constantly listened to the lectures and the privacy of the lecture was lost. In addition, the voices of other people in the house negatively affected the motivation and the flow in the lessons".

In Table 7, when the views of the students participating in the research on the problems they experience with their parents in distance education are examined, 57 of the students (81.4%) stated that they did not have any problems with their parents in distance education, while 13 of them (18.6%) stated that they had problems with their parents. 6 of the students (8.5%) participating in the research stated that they had problems with their parents due to the lack of a suitable environment, 4 of them (5.7%) had problems due to excessive care by their parents, and 3 of them (4.2%) had problems due to excessive technology usage. The direct statements of some students with regard to the problems they experience with their parents in distance education are given below:

S28: "I had problems with my family during this period. My brother usually came near me during the lessons. My mother didn't take my brother away from me because she had some housework".

S9: "It bothered me when my family spoke while my microphone was on during the lessons. Also, my mother believed that I was playing games all the time and we had a problem".

S20: "Yes, I had some problems. During the distance education process, I had to study many subjects which I did not understand with my family. I didn't like this situation."

Discussion and Conclusion

According to the results of the study, teachers working at SACs listed the advantages of distance education as an increase in competence in technology usage, the elimination of the space problem, protection from the pandemic, the elimination of time problem, the elimination of transportation problem, an increase in the attendance rate of students with physical disabilities, and an increase in the number of students attending the course. In this context, teachers had to use technology in their lessons in order to teach effectively in the distance education process, and there was an increase in their competence in technology usage. Supporting the results of the current study, Gökmen, Duman & Horzum (2016), in their study, stated that individuals benefited from the distance education process with the increase in the use of mobile phone, the Internet and computer with the technological development; Erdem (2021), on the other hand, stated that teachers, students, parents recognized a new learning-teaching process and gained the ability to work with technology by recognizing and using technological tools during the distance education process throughout the pandemic. Similar to the results of the present research, the advantages of distance education in Sığın's (2020) study include the elimination of transportation problems, an increase in the number of students attending the course, saving more time, protection from pandemics and providing convenience to students with physical disabilities. UNESCO requested that measures be taken especially for disadvantaged groups in order to reduce the negative situations experienced in the distance education process and announced that it would support countries in terms of sustaining the distance education process (Can, 2020). Demir (2014), on the other hand, states in his study that distance education eliminates the problem of space and time and minimizes the problems encountered in education in terms of time, space and cost.

About 56% of the gifted students studying at SACs think that distance education is not advantageous. In addition, according to the students who think that there are advantageous aspects of distance education, its advantages are saving time, accessibility, protection from diseases, increase in technology availability, increase in the rate of course attendance,

less homework, less writing, and no obligation to wear a mask. Supporting the results of the research, in Apalı & Çulcu's (2021) study, all participants stated that distance education was inefficient and face-to-face education was more efficient. Kırık's (2014) study emphasizes that distance education is important for students to continue their education by eliminating the time and space problems. On the other hand, in Başaran, Doğan, Karaoğlu, & Şahin's (2020) study, students listed the advantages of distance education as flexibility, repetition/reinforcement, protection of health, no homework/exam, and no obligation to attend the course. Sarıtaş, Şahin & Çatalbaş's (2019) study investigating the views of gifted students and their parents revealed that students had difficulty in reaching BİLSEMs. Students stated that they had difficulty in reaching the center and managed to get there only with the support of their parents or by public transportation on weekdays or at weekends. Distance education eliminates the transportation problem and students and parents benefit it.

The teachers working at SACs stated that the most important disadvantages of distance education are the problems in activities that require practice and the lack of technological infrastructure. In addition, an increase in physical problems, communication problems, overlapping the student's own school lessons and SACs's lessons, and the limited assessment and evaluation are among the disadvantages identified in the distance education process. In studies supporting the results of this study (Demir, 2014; Özgöl Sarıkaya & Öztürk, 2017), it was concluded that distance education is not suitable for applied courses. In their study, teachers stated that only theoretical knowledge is included in distance education courses, the process is monotonous and the communication with the students is insufficient. The disadvantages of distance education are listed as no obligation to attend the courses, lack of activities that require practice in lessons, lack of experience of students in this process, problems experienced in asking questions and giving feedback about incomprehensible subjects, and technological deficiencies.

Only a minority of the gifted students studying at SACs, about 15% of them, think that distance education is not disadvantageous, whereas the vast majority, about 85%, think that distance education is disadvantageous. The most important problem faced by students who think that distance education has disadvantages is that they have difficulty in understanding and socializing. In addition, the Internet connection problems, an increase in health problems, limited assessment and evaluation are some other disadvantages in the distance education process. In line with the findings of the current research, there are many studies that reveal the limitations of distance education. In Sirem & Baş's (2020) study, the most difficult case for students in the distance education process due to the COVID-19 epidemic was to have difficulty in understanding and not reviewing the subjects. In the research conducted by Seyhan (2021), it was determined that pre-service teachers had difficulties in getting materials, accessing the Internet, providing a learning environment, and that students had learning difficulties in distance education. In the study conducted by Aktan Acar, Erbaş & Eryaman (2021), the views of pre-school teachers on distance education were generally negative. The study revealed that children had problems in concentrating on lessons, and there was the lack of digital tools, difficulties in following children's development and the lack of socialization. Çıldır (2020) states that students' intrinsic motivation should be boosted by strengthening communication and they should be encouraged to participate in national or international live events and competitions. Ceylan & Umdu Topsakal (2021) draw attention to the importance of students' characteristics, allowing progress at an individual pace, being well organized, continuous communication, evaluation and giving feedback in the distance education process.

The majority of the teachers working at SACs, about 57% of them, stated that there are problems between teachers and students in distance education. Among these problems are a decrease in the number of students attending the courses, not being able to attend the courses on time, not being able to do activities that require practice, and discipline and communication problems. Supporting the results of the current research, in their study, Sarıtaş, Şahin & Çatalbaş (2019) found that there were some problems in the planning of course hours at SACs, the lessons at formal education schools and SACs classes were tiring for students, students did not attend the classes enough, there were negative situations in the Internet connections and students did not care about the lessons. Ceylan & Umdu Topsakal (2021), on the other hand, stated that there were technical problems due to the education environment, the lack of communication and motivation problems stemming from students, and timing problems stemming from the

curriculum in the distance education process. In this context, the inability of the students at SACs to attend the lessons on time or to attend the lessons less may be due to different reasons. During the distance education process in the COVID-19 pandemic period, the Ministry of National Education developed the Education Information Network (EBA) platform, and certain hours of the day for all levels of formal education were planned. However, the Ministry of National Education did not make any arrangements or plans regarding distance education courses at SACs. While formal education schools and SACs followed their course plans, students of SACs may have preferred not to attend SACs classes in order to attend the classes at their own school since some schools do not comply with this plan. For that reason, students may not have been able to attend SACs's classes during the overlapping class hours or attend the classes on time. This situation may have caused communication and discipline problems, especially the inability to do the activities that require practice at a sufficient level. As a matter of fact, Türksoy & Karabulut (2020) state that additional content should be created in EBA during the distance education process and there is a need for activities to meet social needs of students by taking into account individual differences.

In terms of the problems experienced between teachers and students in distance education, gifted students studying at the SACs stated that they experience problems such as inability to express themselves and the Internet connection. In their research, Özyürek, Begde, Yavuz & Özkan (2016) stated that disconnection from the Internet created an obstacle for students to attend classes. According to Ceylan & Umdu Topsakal (2021), students' suffering from exhaustion as a result of being exposed to intensive course programs in distance education may cause low motivation in the education process.

As for the technological problems experienced in distance education, teachers working at the SACs stated that half of the participants had the Internet connection problems, while the other half had the problem of technological hardware inadequacy. About 68% of the gifted students studying at the SACs experienced technological problems in distance education. Among the technological problems experienced by students are the Internet connection problems, lack of computer hardware and insufficient Internet capacity as some examples. There are many research results (Apalı & Çulcu, 2021; Can, 2020; Özdoğan & Berkant, 2020; Ülger, 2021) that support the results of this study: Some technical problems are listed as poor information technology infrastructures, inadequacy of technological equipment, poor Internet connections, limited Internet access, and lack of the Internet and computers in distance education provided during the pandemic process. This situation prevents students from reconcentrating on the lesson, causes them to experience stress (Apalı & Çulcu, 2021), and health problems occur in the distance education process (Karatay, Kaya, & Başer, 2021; Özdoğan & Berkant, 2020).

The teachers working at the SACs, about 64% of them, think that they have problems with students' parents in distance education. Teachers experienced some problems due to parents' interference in lessons and lack of communication. In the distance education process, teachers also faced other problems with parents. The attendance of some parents with their students in distance education courses, their lack of interest in this process, and some parents' failure to provide a suitable course environment for students can be given as some examples of other problems. The majority of the gifted students studying at the SACs, approximately 81% of them, did not have any problems with their parents in distance education. Students who had problems with their parents, on the other hand, had some problems due to the lack of a suitable environment, excessive care and excessive technology usage.

Similar to the results of this research, Aykar & Yurdakal (2021), according to the results of their study, revealed that the attitudes and behaviours of the families in this period caused negative effects on the students and put pressure on them. In their study, Karakuş, Esendemir, Ucuzsatar & Karacaoğlu (2021) found that parents and students could not adapt to the distance education process, and even that students' spending more time with technological tools in the distance education process could be a problem for their parents. According to the study results of İnci Kuzu (2020), parents spent more time with students during the distance education process, and even attended the classes with their children. It was concluded that this excessive care affected students negatively.

Recommendations

According to the results of the present study, the following recommendations can be made:

- In order to eliminate the problems experienced in distance education, especially in applied education, new software programs should be developed, and they should be used in virtual environments.
- In order to increase the quality of the distance education process, in-service activities for teachers should be organized and the programs that can be used in this process should be introduced.
- Infrastructure and superstructure services and the Internet network required for better distance education should be strengthened and expanded.
- In order to support students with insufficient technological equipment, functional and fully equipped local distance education centres should be established in certain areas and offered to the service of these students.
- In order to minimize communication problems in distance education, Whatsapp Web and Web 2.0 tools that enable cooperation and working together should be used.
- The overlap between the course plans of the SACs and the school course plans in which students attend their formal education should be prevented. For this, it can be possible if the Provincial/District Directorates of National Education provide the necessary cooperation and coordination and plan the distance education process together.
- In order to prevent absenteeism and to avoid disciplinary problems in distance education, a certain amount of compulsory attendance must be applied.
- While planning the distance education process, it is important to keep the course hours short and to take breaks at certain time intervals. Thus, boredom from classes can be eliminated and health problems can be prevented.
- Information can be provided, trainings can be given, seminars and programs can be organized according to the needs of teachers, students and students' parents at BİLSEM in order to carry out a more effective distance education process.

Limitations of Study

The research is limited to Nevşehir Halil İncekara Science and Art Center school.

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Appendix 1. *Interview Form*

Interview Questions

Q1. Are there any advantages of the distance education process during the COVID-19 pandemic period? If so, what are they?

Q2. Are there any disadvantages of the distance education process during the COVID-19 pandemic period? If so, what are they?

Q3. Did you have any problems with your students/teachers during the distance education process in the COVID-19 pandemic period? What were these problems?

Q4. Did you experience technological problems during the distance education process in the COVID-19 pandemic period? If so, what were these problems?

Q5. Did you have any problems with students' parents during the distance education process in the COVID-19 pandemic period? If so, what were these problems

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Research Article

Review of the social studies course academic achievements of middle school students in the context of behavioral grades

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Abstract

In this study, it is aimed to examine the social studies academic achievements of secondary school students in Turkey according to various behaviors (adaptation to school culture, self-care, self-awareness, communication and social interaction, conforming to common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity). In accordance with this purpose, in the fall term of 2021-2022, "the primary school institutions classroom passing book" and "the evaluation schedule of student behavior" showing the course grades and behavior grades of a total of 484 seventh graders who were studying at six public secondary schools in Kilis city center was reached. The data obtained were transferred to SPSS 23 program and analyzed. In the research, significant differences were found between the students' academic achievements and "adaptation to school culture", "self-care", "self-awareness", "communication and social interaction", "conforming to common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study", "environmental sensitivity". The research findings showed that the academic success of the social studies course was in favor of students who were 'very good' and 'very good' among students whose behavior level was 'good' and 'should be improved', with "adaptation to school culture", "self-care", "self-awareness", "communication and social interaction", "conforming to common values", "solution-oriented", "teamwork and responsibility", "efficient study" and "environmental sensitivity."

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Introduction

Social studies course is a public education course that integrates social science disciplines according to children's holistic learning. Generalizations with facts, knowledge and concepts of social sciences largely constitute the content of social information (Öztürk, 2009, p. 17). Sönmez (2005, p. 455) defines social information as the process of bonding based on proving social reality and the resulting vital information. Erden (1998) defines social information as a field of study where the necessary knowledge from social sciences is based on the necessary information to raise good and responsible citizens in primary and secondary schools, and students are given the basic knowledge, skills, values and attitudes they need about social life.

Undoubtedly, with this field of study, individuals both nationally and globally are raised as citizens with national consciousness, willing to live democratic, secular, national and contemporary values, and know that they are equal before

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the law; they are equipped with many knowledge, skills and values such as acknowledging the need to protect and develop cultural heritage, explaining interaction between human and environmental and developing space perception skills, trying to protect natural resources within environmental sensitivity and having a sustainable environmental understanding, and having critical thinking skills as individuals who know how to access accurate and reliable information [Ministry of Education (ME), 2018]. Although "social studies" are not mentioned as names when examining the historical development of the social studies course, it is seen that the focus has been on raising people throughout history in the subjects included in the current Social Studies education (Kartal, 2020). Today, it is aimed to give students knowledge, skills, values and attitudes based on national and universal values in line with their own interests and needs related to social life in order to realize their social existence and to help them to have responsibility towards themselves, the society, the country and the world (ME, 2018, p. 8).

As a matter of fact, determining the extent to which these knowledge, skills, values and attitudes, namely the targeted objectives and behaviors, are acquired in the students is seen as important as the purposes and behaviors aimed at the students. In this context, success defined as achieving the specified goal and achieving what is desired is defined as a whole of behaviors consistent with the objectives of the program when considered from the point of view of education (Demirtaş & Güneş, 2002). If student exhibits target behaviors in the program, they can be considered successful. The concept of success in education refers to academic achievement, which is usually the expression of the skills or knowledge gained with the grades, test scores or both that are developed in the courses taught in the school and appreciated by the teachers. Academic success is also seen as very important for their families and environment as it enables students to prepare for professional and social life and shapes their future (Sarıer, 2016).

There are many factors or variables that influence students' academic achievements. These factors, "also known as learning variables, are related to physiological, psychological and social conditions and conditions. Learning variables affect the student's level of success positively or negatively" (Uluğ, 2012). When the field was examined, it was revealed that cognitive factors (intelligence, learning speed, etc.), sensory factors (self-esteem, study habits, personality structure, motivation, self-sufficiency, etc.) and environmental factors (parental attitude and educational status, socio-economic status of the family, attitude and qualifications of school administrators and teachers, etc.) were effective on the academic achievements of the students (Arıcı, 2007; Sarıer, 2016; Şevik, 2014). It is also stated in the literature that academic success is affected by the student, school and family; in other words, there are various studies (Arıcı, 2007; Dağdelen, 2013; Özer Özkan & Anıl, 2011; Şevik, 2014) revealing that they, the family, and the school are influential on students' success and failure.

Sarıer (2016) stated that many variables such as "self-esteem, self-sufficiency, motivation, study habits, attitude towards the lesson, teacher behaviors, leadership of the headmaster, school culture, attitudes and behaviors of parents, participation in education, parental education status, socio-economic level of the family" can be influenced on academic success. In addition, there has been no study on whether the behaviors exhibited by the students on their academic achievements (*adaptation to school culture, self-care, self-awareness, communication and social interaction, conforming to common values, solution-oriented, participating in social activities, teamwork and responsibility, efficient study, environmental sensitivity*) are effective. In other words, no studies were found in which the social studies academic achievements of middle school students were examined according to "adaptation to school culture", "self-care", "self-awareness", "communication and social interaction", "compliance with common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study", "environmental sensitivity". Therefore, in order to eliminate this deficiency observed in this study, the relationship between the academic achievements of middle school students in their report cards as well as the behavioral grades included is examined. In this context, it is useful to briefly clarify the behaviors of "adaptation to school culture", "self-care", "self-awareness", "communication and social interaction", "conforming to common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "productive work" and "environmental sensitivity" (Official newspaper, 2007).

Adaptation to School Culture

In school culture adaptation behavior, students are expected to contribute to the decision-making processes in the school, comply with the established school rules, act responsibly towards school employees, attend school/class regularly, and protect the school, environment and educational tools.

Self-care

In self-care behavior, students should take positive attitudes and behaviors such as taking care of body cleanliness, paying attention to the cleanliness of their clothes, taking care of the order and order of their belongings and following healthy eating rules.

Self-awareness

With "self-awareness" behavior, students are expected to be aware of their interests, abilities, skills, recognize their weaknesses and strengths and develop weaknesses, use their free time effectively, and determine their goals according to their desires and needs.

Communication and Social Interaction

With "communication and social interaction" behavior, students are expected to follow the rules of kindness in communication, use positive communication language and avoid negative communication language, benefit from the exemplary behaviors they see as a result of social interaction, take part in the group, know their rights and responsibilities, exercise their rights and fulfill their responsibilities.

Conforming to Common Values

With the behavior of "conforming to common values", students are expected to respect the rights and freedoms of others, to help others when necessary, to be tolerant of individual and cultural differences, and to respect the common values of society.

Solution-oriented

With a "solution-oriented" behavior, students are expected to recognize and identify problems, use different methods and techniques to solve the problem, develop alternative solutions to the problem and take responsibility for solving the problem.

Participation in Social Activities

With the behavior of "participation in social activities", students are expected to actively participate in various social and cultural activities in the school, to be successful in the social, cultural, artistic and sporting activities they actively participate in, to be interested in or follow school activities that they cannot actively participate in.

Teamwork and Responsibility

Many positive attitudes and behaviors are expected from the students, such as working in cooperation with "teamwork and responsibility" behavior, fulfilling their duties and responsibilities within the group, and carrying out individual studies within the group if necessary.

Efficient Study

With "efficient study" behavior, students are expected to work planned and regularly, to use time effectively and efficiently, and to be aware of the impact of effective and "efficient study" on their development.

Environmental Sensitivity

With "environmental sensitivity" behavior, students are expected to be sensitive to environmental activities, participate in environmental activities, protect living things and natural habitats, keep the environment clean, use natural resources efficiently, and show many positive attitudes and behaviors such as turning to renewable energy sources.

Aim and Problem of Study

In the Turkish education system, student academic success and behavioral grade are expressed with a scorecard grade. Both academic achievement and behavioral grade reflected in the student's report card are considered to be decisive and perhaps the most important criterion for success. In this study, academic achievement and behavior grades were considered as scorecard grades. Thus, the success levels of the seventh graders in the social studies course were revealed

and the relationship between their academic achievements and behavioral grades in this course was analyzed. In this context, it is aimed to examine the social studies academic achievements of middle school students according to various behavioral *(adaptation to school culture, self-care, self-awareness, communication and social interaction, compliance with common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity*).

The main problem sentence of the study is;

- What is the level of academic achievement of the secondary school students in the social studies course and has they differed significantly according to their academic achievements and behavioral grades (adaptation to school culture, self-care, self-awareness, communication and social interaction, conforming to common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity)?

Method

Research Model

The current research is designed according to the scanning pattern, which is one of the quantitative research methods. Screening research patterns are "quantitative research patterns in which researchers collect information by scanning a sample group or the entire universe to explain the attitudes, views, behaviors or characteristics of a universe" (Creswell, 2012, p. 376). In the screening design, quantitative research was conducted on a group (f=484) sample taken from the universe in order to reach a general conclusion or judgment about even (secondary school students) (Karasal, 2011). "The primary school institutions classroom passing book" and "the evaluation schedule of student behavior" was used to collect the research data.

Sample

The studying group of this research consists of 484 secondary school seventh graders, 254 girls and 230 (47.5%) boys, who are studying at six public secondary schools in the central district of Kilis province in the spring semester of the 2021-2022 academic year. The sample of the present study was determined by the simple sampling method, which is one of the probability-based sampling types. In the simple sampling method, where the sample has a high power to represent the population, all units in the population have an equal and independent chance to be selected for the sample. The choice of one individual does not affect the choice of other individuals (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel, 2016).

Data Collection Tool and Process

The data collection tools of this research constitute "the primary school institutions classroom passing book" and "the evaluation schedule of student behavior". Student "the primary school institutions class passing book", academic achievement scores of students in a branch for all courses; "the evaluation schedule of student behaviors" is a document showing the students' "school culture compliance", "self-care", "self-awareness", "communication and social interaction", "compliance with common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study", "environmental sensitivity" behavior grades of students in a branch. Accordingly, a digital sample of "the primary school institutions classroom passing book" and "the evaluation schedule of student behavior" was taken in accordance with the school administration's knowledge and permission by going to the schools where the research was carried out. This data was then entered as data in SPSS 23. In the grade passing book of primary institutions, students' social studies are between 0 and 100 of their academic achievements; behavioral grades on the evaluation chart of student behaviors were scored with a score between 1 and 3. Accordingly, student academic achievement grades are rated "low" between 0 and 44, "pass" between 45 and 54, "medium" between 55 and 69, "good" between 70 and 84 and "very good" between 85 and 100. Student behavior grades are evaluated as 1 "should be improved", 2 as "good" and 3 as "very good".

Data Analysis

SPSS 23 program was used for the analysis of the data obtained from the sample group within the scope of the research. In the analysis of the data, the normalities of the data were examined first. When the data obtained from the primary school institutions classroom passing book were analyzed (distortion= -.225; pressure= -1.161; shapiro wilk and kolmogorov smirnov values= .000 <.05), "it was determined that the data did not show normal distribution. Non-parametric tests were used in statistical analyses because the data did not show normal distribution". Accordingly, "Kruskal Wallis H" test was performed to examine whether the academic achievement levels of secondary school students differed significantly according to their behavioral grades (*school culture compliance, self-awareness, communication and social interaction, compliance with common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity*). "Post Hoc Tamhane" "test was applied to determine which groups the difference was between" (Büyüköztürk, 2014).

Results

When the social studies course academic achievement levels of secondary school students were examined, the academic achievement levels of the students were evaluated in five groups: "low" (0-44), "passing" (45-54), "medium" (55-69), "good" (70-84) and "very good" (85-100) and the results of the analysis were presented in Table 2. According to Table 2, when the social studies course academic achievements of the secondary school students who participated in the study were examined, it was determined that 8.5% were low, 12.4% were passing, 22.5% were intermediate, 21.7% were good and 34.9% had very good grades. Therefore, it can be said that more than half (55.6%) of secondary school students have good and very good social studies academic achievements. Within the scope of the research, descriptive analysis of the scores taken in the social studies course was also carried out. In this context, the highest score in the social studies course was 100, while the lowest score was 33. According to this data, the rand score is 67, which is the difference between the highest and lowest score. In addition, the most repeated (mode) score value in the social studies course was calculated as 94 and the median score value was 74. The average social studies course grade of secondary school students was found to be good ($\bar{X}$=72.23).

Table 1. Social Studies Course Academic Achievement Levels of Middle School Students

Level	Intervals	n	%
Miscarriage	(0-44)	41	8.5
Passes	(45-54)	60	12.4
Middle	(55-69)	109	22.5
Good	(70-84)	105	21.7
Very good	(85-100)	169	34.9
Total	(0-100)	484	100

Maximum points= 100; minimum score= 33; ranj=67 mod=94; median=74; $\bar{X}$=72.23; SS=18.12

The difference of "secondary school students' academic success" in social studies course according to school culture adaptation behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of middle school students differed significantly according to the behavior of "adaptation to school culture" and the results of the analysis were given in Table 2.

Table 2. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to School Culture Adaptation Behavior

Level of adaptation to school culture	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved (A)	6	36.58				A-B
Good (B)	74	93.44	2	116.148	.000	A-C
Very good (C)	404	272.86				B-C
Total	484					

p<0.5

According to the data in Table 2, it was determined that the academic achievements of secondary school students differed significantly according to the behavior of "adaptation to school culture" (X^2=116.148; p<0.5). The "Post Hoc Tamhane" test "was applied to determine which groups the difference was between". The analysis found that the difference was between students with "very good" behavior levels and students who were "well developed" and "good". A significant difference was also found between students with "good" behavior levels and students who should be "improved" in "adaptation to school culture". When the averages and average differences are taken into account, it is seen that the difference between these groups is in favor of students whose attitude to school culture is "very good" and "good" (Table 3). Accordingly, it was concluded that there is a positively significant relationship between the social studies academic achievements of secondary school students and the behavior of "adaptation to school culture", and that the social studies course academic success increases as the behavior level improves very well.

Table 3. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with School Culture Compliance Behavior Level

Variable	Category		Avg. Difference	ss	p
Adaptation to school culture	Must be improved	Good	-8.279	2.71	.030*
		Very good	-32.712	2.31	.000*
	Good	Must be improved	8.279	2.71	.030*
		Very good	-24.432	1.81	.000*
	Very good	Must be improved	32.712	2.31	.000*
		Good	24.437	1.81	.000*

**p<.05*

The difference of "secondary school students' academic success" in social studies course according to self-care behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to "self-care" behavior and the results of the analysis were given in Table 4.

Table 4. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Self-Care Behavior

Level of self-care	n	Sequence avg.	sd	X^2	p	Sig. difference
Must be improved(A)	5	15.5				A-B
Good (B)	60	74.69	2	114.908	.000	A-C
Very good (C)	419	269.24				B-C
Total	484					

p<0.5

According to the data in Table 4, it was determined that the academic achievements of secondary school students differed significantly according to "self-care" behavior (X^2=114.908; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" "self-care" behavior level and students who were "improved" and "good". There was also a significant difference between students with "good" "self-care" behavior levels and students who should be "improved". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "self-care" behavior is "very good" and "good" (Table 5). According to these data, it was determined that there is a positively significant relationship between the social studies academic achievements of secondary school students and "self-care" behavior, and that the academic success of the social studies course increases as the level of "self-care" behavior improves very well.

Table 5. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Self-Care Behavior Level

Variable	Category		Avg. Difference	ss	p
Self-care	Must be improved	Good	-10.816	2.51	.005*
		Very good	-37.537	2.13	.000*
	Good	Must be improved	10.816	2.51	.005*
		Very good	-26.721	1.72	.000*
	Very good	Must be improved	37.537	2.13	.000*
		Good	26.721	1.72	.000*

*p<.05

The difference of "secondary school students' academic success" in social studies course according to self-awareness behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of middle school students differed significantly according to "self-awareness" behavior and the results of the analysis were given in Table 6.

Table 6. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Self-Awareness Behavior

Level of self-awareness	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved(A)	12	65.75				A-B
Good (B)	99	128.73	2	109.275	.000	A-C
Very good(C)	373	278.38				B-C
Total	484					

p<0.5

According to the data in Table 6, it was determined that the academic achievements of secondary school students differed significantly according to "self-awareness" behavior (X^2=109.275; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was seen that the difference was between students with "very good" "self-awareness" behavior level and students who were "improved" and "good". In addition, a significant difference was found between students with "good" "self-awareness" behavior and students who should be "improved". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "self-awareness" behavior is "very good" and "good" (Table 7). According to these data, it was concluded that there is a positively meaningful relationship between the social studies academic achievements of secondary school students and the behavior of "self-awareness", and that the social studies course academic success increases as the level of "self-awareness" behavior improves very well.

Table 7. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Self-Awareness Behavior Level

Variable	Category		Avg. Difference	ss	p
Self-awareness	Must be improved	Good	-8.565	2.74	.012*
		Very good	-28.744	2.30	.000*
	Good	Must be improved	8.565	2.74	.012*
		Very good	-20.178	1.88	.000*
	Very good	Must be improved	28.744	2.30	.000*
		good	20.178	1.88	.000*

*p<.05

The difference of "secondary school students' academic success" in social studies course according to communication and social interaction behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to "communication and social interaction" behavior and the results of the analysis were given in Table 8.

Table 8. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Communication and Social Interaction Behavior

Communication and social interaction level	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved (A)	5	54.7				
Good (B)	41	76.96	2	73.448	.000	A-C
Very good (C)	438	260.14				B-C
Total	484					

p<0.5

According to the data in Table 8, it was determined that the academic achievements of secondary school students differed significantly according to "communication and social interaction" behavior (X^2=73.448; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" "communication and social interaction" behavior levels and students who were "improved" and "good". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "communication and social interaction" behavior is "very good" (Table 9). In general, it has been concluded that there is a positively meaningful relationship between the academic achievements of secondary school students and the behavior of "communication and social interaction", and that as the level of "communication and social interaction" behavior improves very well, the academic success of the social studies course increases in general.

Table 9. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Communication and Social Interaction Behavior Levels

Variable	Category		Avg. Difference	ss	p
Communication and social interaction	Must be improved	good	-2.590	2.56	.694
		Very good	-27.866	1.89	.000*
	Good	Must be improved	2.590	2.56	.694
		Very good	-25.276	2.06	.000*
	Very good	Must be improved	27.866	1.89	.000*
		good	25.276	2.06	.000*

*p<.05

The difference in the "academic success of secondary school students" in social studies course according to the behavior of conforming to common values

"Kruskal Wallis H" test was performed to examine whether the social studies course academic achievements of secondary school students differed significantly according to the behavior of "conforming to common values" and the results of the analysis were given in Table 10.

Table 10. *Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to The Behavior of Conforming To Common Values*

Level of compliance with common values	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved (A)	3	8.5				A-B
Good(B)	94	151.01	2	60.076	.000	A-C
Very good (C)	387	266.54				B-C
Total	484					

p<0.5

According to the data in Table 10, it was determined that the academic achievements of secondary school students

differed significantly according to the behavior of "conforming to common values" (X^2=60.076; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" behavior level in "conforming to common values" and students who were "improved" and "good". In addition, a significant difference was found between students with "good" behavior level and students who should be "improved" in "conforming to common values". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose behavior to conform to common values is "very good" and "good" (Table 11). Accordingly, it was determined that there is a positively significant relationship between the social studies academic achievements of secondary school students and the behavior of "conforming to common values", and that academic success of the social studies course increases as the level of behavior in "conforming to common values" improves very well.

Table 11. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Behavior Level in Accordance with Common Values

Variable	Category		Avg. Difference	ss	p
Conforming to common values	Must be improved	good	-21.570	1.91	.000*
		Very good	-37.162	0.90	.000*
	Good	Must be improved	21.570	1.91	.000*
		Very good	-15.591	2.06	.000*
	Very good	Must be improved	37.162	0.90	.000*
		good	15.591	2.06	.000*

*p<.05

The difference in the "academic success of secondary school students" in social studies course according to their solution-oriented behavior

"Kruskal Wallis H" test was performed to examine whether the social studies course academic achievements of secondary school students differed significantly according to the "solution-oriented" behavior and the analysis results were given in Table 12.

Table 12. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Solution-Oriented Behavior

Solution-oriented level	n	Sequence avg..	sd	X^2	p	Significant difference
Must be improved (A)	35	95.31				A-B
Good (B)	79	151.37	2	94.413	.000	A-C
Very good(C)	370	275.88				B-C
Total	484					

p<0.5

According to the data in Table 12, it was determined that the academic achievements of secondary school students differed significantly according to the behavior of "solution-oriented" (X^2=94.413; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was seen that the difference was between students with "very good" behavior level and students who were "improved" and "good". In addition, a significant difference was found between students with a "good" level of "solution-oriented" behavior and students who should be "improved". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "solution-oriented" behavior is "very good" and "good" (Table 13). According to these data, it was concluded that there is a positively meaningful relationship between the social studies academic achievements of secondary school students and the behavior of "solution-oriented", and that the social studies course academic success increases as the level of "solution-oriented" behavior improves very well.

Table 13. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Their Level of Solution-Oriented Behavior

Variable	Category		Avg. Difference.	ss	p
Solution-oriented	Must be improved	Good	-8.228	3.25	.040*
		Very good	-24.865	2.70	.000*
	Good	Must be improved	8.228	3.25	.040*
		Very good	-16.637	2.15	.000*
	Very good	Must be improved	24.865	2.70	.000*
		Good	16.637	2.15	.000*

*p<.05

The difference of "secondary school students' academic success" in social studies course according to their participation behavior in social activities

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to the behavior of "participation in social activities" and the results of the analysis were given in Table 14.

Table 14. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Participation Behavior in Social Activities

Level of participation in social activities	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved (A)	3	43.33				
Good (B)	69	133.92	2	55.813	.000	B-C
Very good(C)	412	262.13				
Total	484					

p<0.5

According to the data in Table 14, it was determined that the academic achievements of secondary school students differed significantly according to the behavior of "participation in social activities" (X^2=55.813; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" behavior level and students who were "good" in "participation in social activities". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose participation behavior in social activities is "very good" (Table 15). Accordingly, it was concluded that there is a positively significant relationship between the social studies academic achievements of secondary school students and the behavior of "participation in social activities", and that academic success in the social studies course increases as the level of "participation in social activities" increases from good to very good.

Table 15. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Participation Behavior Level in Social Activities

Variable	Category		Avg. Difference.	ss	p
Participation in social activities	Must be improved	Good	-15.058	7.66	.423
		Very good	-32.608	7.37	.130
	Good	Must be improved	15.057	7.66	.423
		Very good	-17.550	2.38	.000*
	Very good	Must be improved	32.608	7.37	.130
		Good	17.550	2.38	.000*

*p<.05

The difference of "secondary school students' academic success" in social studies course according to teamwork and responsibility behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to "teamwork and responsibility" behavior and the analysis results were given in Table 16.

Table 16. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Teamwork and Responsibility Behavior

Teamwork and responsibility level	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved (A)	21	76.81				A-B
Good (B)	97	146.87	2	97.594	.000	A-C
Very good (C)	366	277.35				B-C
Total	484					

p<0.5

According to the data in Table 16, it was determined that the academic achievements of secondary school students differed significantly according to "teamwork and responsibility" behavior (X^2=97.594; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was seen that the difference was between students with "very good" level of "teamwork and responsibility" behavior and students who were "improved" and "good". When the averages of the queues and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "teamwork and responsibility" behavior are "very good" (Table 17). In general, it was found that there is a positively meaningful relationship between the social studies academic achievements of secondary school students and "teamwork and responsibility" behavior, and that academic success in the social studies course increases as the level of "teamwork and responsibility" behavior improves very well.

Table 17. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Participation Behavior Level in Social Activities

Variable	Category		Avg. Difference.	ss	p
Teamwork and responsibility	Must be improved	Good	-9.793	2.91	.049*
		Very good	-27.315	2.41	.000*
	Good	Must be improved	9.793	2.91	.049*
		Very good	-17.522	2.00	.000*
	Very good	Must be improved	27.315	2.41	.000*
		Good	17.522	2.00	.000*

*$p<.05$

The difference in the "academic success of secondary school students" in social studies course according to their efficient study behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to "efficient study" behavior and the results of the analysis were given in Table 18.

Table 18. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Efficient Study Behavior

Efficient study level	n	Sequence avg.	sd	X^2	p	Significant difference
Must be improved(A)	56	76.1				A-B
Good(B)	140	180.49	2	164.372	.000	A-C
Very good (C)	288	305				B-C
Total	484					

p<0.5

According to the data in Table 18, it was determined that the academic achievements of secondary school students differed significantly according to "efficient study" behavior (X^2=164.372; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" level of "efficient study" behavior and students who were "improved" and "good". In addition, a significant difference was found between students with "good" levels of productive studying behavior and students who should be "improved". When the averages of the queue and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "efficient study" behavior is "very good" and "good" (Table 19). According to these data, it was determined that there is a positively meaningful relationship between the social studies academic achievements of secondary school students and "efficient study" behavior, and that the academic success of the social studies course increases as the level of productive studying behavior improves very well.

Table 19. Tamhane Test Result Comparing Students' Social Studies Academic Achievement with Efficient Study Behavior Level

Variable	Category		Avg. Difference.	ss	p
Efficient study	Must be improved	Good	-15.050	1.85	.000*
		Very good	-30.775	1.58	.000*
	Good	Must be improved	15.050	1.85	.000*
		Very good	-15.725	1.57	.000*
	Very good	Must be improved	30.775	1.58	.000*
		Good	15.725	1.57	.000*

*p<.05

The difference of "secondary school students' academic success" in social studies course according to environmental sensitivity behavior

"Kruskal Wallis H" test was performed to examine whether the academic achievements of secondary school students differed significantly according to "environmental sensitivity" behavior and the results of the analysis were given in Table 20.

Table 20. Average Rank, Standard Deviation and Kruskal Wallis Test Results of Students' Academic Achievement in Social Studies Course According to Environmental Sensitivity Behavior

Environmental sensitivity level	n	Sequence avg.	sd	X^2	p	Sig. difference
Must be improved(A)	7	69.79				
Good (B)	69	141.49	2	55.073	.000	A-C
Very good (C)	408	262.55				B-C
Total	484					

p<0.5

According to the data in Table 20, it was determined that the academic achievements of secondary school students differed significantly according to "environmental sensitivity" behavior (X^2=55.073; p<0.5). The "Post Hoc Tamhane test was applied to determine which groups the difference was between". In the analysis, it was observed that the difference was between students with "very good" "environmental sensitivity" behavior level and students who were "improved" and "good". When the averages of the queues and the average differences are taken into account, it is seen that the difference between these groups is in favor of students whose "environmental sensitivity" behavior is "very good" (Table 21). In general, it has been concluded that there is a positively meaningful relationship between the social studies academic achievements of secondary school students and "environmental sensitivity" behavior, and that while the level of "environmental sensitivity" behavior is improving very well, the academic success of the social studies course increases in general.

Table 21. Tamhane Test Result Comparing Students' Social Studies Academic Achievements with Environmental Sensitivity Behavior Level

Variable	Category		Avg. Difference.	ss	p
Environmental sensitivity	Must be improved	Good	-11.165	5.41	.199
		Very good	-27.542	5.03	.004*
	Good	Must be improved	11.165	5.41	.199
		Very good	-16.376	2.32	.000*
	Very good	Must be improved	27.542	5.03	.004*
		Good	16.376	2.32	.000*

*p<.05

Discussion and Conclusion

In this study, the academic achievements of middle school students were examined according to various behaviors (adaptation to school culture, self-care, self-awareness, communication and social interaction, conforming to common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity). In the study, it was determined that the academic achievements of secondary school students differed significantly according to "school culture adaptation", "self-care", "self-awareness", "communication and social interaction", "conforming to common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study" and "environmental sensitivity" behaviors.

As a result of the research, it was concluded that the social studies course success of secondary school students was in favor of students who were "very good" and "very good" among students whose level of social studies, "self-awareness", "communication and social interaction, "compliance with common values", "solution-oriented", "teamwork and responsibility", "efficient study" and "environmental sensitivity" behavior level were "very good" and "should be improved".

In addition, it was determined that the students' social studies academic achievements differed significantly according to the behavior of "participation in social activities", and that the difference was only in favor of students who were "very good" and "very good" students. In addition, it has been determined that the academic achievements of the students are in favor of students who are "good" among students who have a "good" level of social studies academic achievement, "self-care", "self-awareness", "compliance with common values", "solution-oriented", "teamwork and responsibility" and "efficient study" behavior. Therefore, it can be said that there is a positively significant relationship between the social studies academic achievement scores and behavioral scores of middle school students, and as the level of behavior improves very well, the academic success of the social studies course increases in general. However, the opposite can be said. In other words, with the increase in the academic achievements of the students, it can be stated that there is a significant increase in behavior scores such as "adaptation to school culture", "self-care, self-awareness", "communication and social interaction", "conforming to common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study", "environmental sensitivity". Therefore, it can be said that there is a positive two-way interaction between academic achievement score and behavioral grades.

No studies have been found that examine the relationship between students' academic achievements and behaviors. Therefore, the findings of the current study could not be compared. However, the perception of self-sufficiency when the field is examined (Aydın, 2010; Ayotola & Adedeji, 2009; Klomegah, 2007; Liu & Koirala, 2009), self-esteem (Choi, 2005), study habit (Özer Özkan & Anıl, 2011; Patterson et al., 2003), attitude towards the course (Yenilmez & Özabacı, 2003), motivation (Boyd, 2002; Gottfried, Fleming & Gottfried, 2001), attitude and leadership of the school administration (Leithwood & Jantzi, 2000; Sarı & Cenkseven, 2008), school culture (Barnett & McCormick, 2004; Fiore, 2000; Fuller & Clarke, 1994; Schoen & Teddlie, 2008), teacher behavior (Hattie, 2009; Kızıldağ, 2009; Şişman, 2014; Şevik, 2014), family-attended events (Demir, 2021, Şad, 2012, Türe & Deveci, 2021), socio-economic level of the family (Akyol, Sungur & Tekkaya, 2010; Arıcı, 2007; Kocaman, 2008), parents' educational status (Koutsoulis & Campbell, 2001; Özer Özkan & Anıl, 2011; Özkan & Yıldırım, 2013; Şevik, 2014) and the attitudes and behaviors of

parents (Carlson, et al., 1999) have been found to have a positive effect on students' academic achievements. Based on this information, self-sufficiency perception, self-esteem, study habits, interest, attitude and motivation for the course, motivation for school, attitude and leadership of the school administration, school culture, teacher behaviors, family participation activities, socio-economic level of the family, educational status of parents and student attitudes and behaviors are compatible with the "school culture of the students", "self-care", "self-awareness", "communication and social interaction", "compliance with common values", it can be said that it has a positive effect on "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study" and "environmental sensitivity" behaviors.

Based on the findings of the current research, the following recommendations can be made:

- This research was carried out with 484 Turkish students attending the seventh grade of secondary school within the scope of social studies course. Similar studies with different sample groups may be recommended.
- In this study, the academic achievements of the students were examined in terms of various behaviors (adaptation to school culture, self-care, self-awareness, communication and social interaction, conforming to common values, solution-oriented, participation in social activities, teamwork and responsibility, efficient study, environmental sensitivity). Similar studies can be carried out within the scope of different disciplines.

Limitations of Study

This study has some limitations. The research was limited to sample 484 students in six public secondary in one district in the Kilis Province in Turkey. The data collection tools of this research constitute "the primary school institutions classroom passing book" and "the evaluation schedule of student behavior". Student "the primary school institutions class passing book", academic achievement scores of students in a branch for all courses; "the evaluation schedule of student behaviors" is a document showing the students' "school culture compliance", "self-care", "self-awareness", "communication and social interaction", "compliance with common values", "solution-oriented", "participation in social activities", "teamwork and responsibility", "efficient study", "environmental sensitivity" behavior grades of students in a branch. Therefore, the data of the research are limited to these data collection tools. Moreover, the criterion validity for the data collection tools were not examined.

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Research Article

Gifted students' value perceptions: differentiation to socio-demographic variables[1]

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Abstract

In Turkiye, Science and Art Centers (SACs) operate affiliated to the Ministry of National Education (MoNE) in order to develop individual talents and raise awareness of gifted students in preschool, primary school, secondary school and high school without disrupting their regular schooling. It is of great importance for not only the individual happiness of gifted children but also for the entire society to identify them at an early age and educate them as required by their personal abilities. The aim of this study is to examine the value perceptions of gifted students studying at SACs against selected variables. It is a survey research designs. The study sample consists of 712 students attending SACs at 14 different provinces determined with the maximum diversity sampling method. The data were collected by using the "Perceptions for Values Scale" developed by Beldağ (2012) comprised of seven sub-dimensions. Data analysis was performed by applying t-test and One-Way Analysis of Variance. As a result, the variables of gender, mother's education level, grade level, TV program(s) watched, and interests (hobbies) were found to affect value acquisition of gifted students. In light of the study results, it is recommended to include more values education practices in the contents taught at SACs.

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Introduction

Giftedness is defined as the combination of above-average ability, creative thinking and sense of mission (Kurnaz & Barışık, 2020). It is known that there is a considerable number of gifted individuals in every society. Educating these individuals right and well has been considered important especially since the second half of the 20th century. Gifted students can be seen as an important and strategic force in understanding and particularly solving social problems. Failing to benefit from this rich potential and provide them good education may bring losses besides new problems to the society.

It has been found that gifted individuals are ahead of their peers in terms of some values, character and personality, as well as their intelligence levels (Cash & Lin, 2022; Kurnaz, Çiftçi, & Karapazar, 2013). The moral identity levels of these students are higher compared to other students (Özbey & Adam Karduz, 2018). Gifted students react at a higher level to situations such as destruction of nature, destruction of living things, injustice to people, pollution of the environment, and war and violence as they are triggered by feelings such as compassion and thinking about the well-being of others (Özbey & Sarıçam, 2016). These students are self-confident and energetic and have leadership skills. For

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this reason, leadership in the gifted is an important part of character education (Berkowitz & Hoppe, 2009). It is crucial for the society, country and humanity to identify the gifted students in the society and to put them through education compliant with their abilities. In addition to helping generate new knowledge and transfer the knowledge of humanity to future generations thanks to their extraordinary traits and thinking skills (Chowkase & Watve, 2021), gifted individuals take interest in many social phenomena such as politics, religion, environmental problems and wars (Farrall & Henderson, 2015). Activating these students' superior thinking skills with different techniques leads to significant improvement in their learning (Avcu & Yaman, 2022). Although they are ahead of their peers in moral development capacity, they face moral dilemmas due to the fact that they go through the fixed stages faster. While these students have the potentials to create great opportunities for the society and humanity depending on the education they receive and the environment they live in, they may emerge as a danger or threat in the opposite scenario (Hökelekli & Gündüz, 2004; Tortop, 2018). The risk is about their leaving school and isolating themselves from society. When the literature is examined, it is seen that although gifted students are at a certain level in terms of values and character traits, some of them exhibit moral problems like arrogance and stubbornness (Kurnaz et al., 2013). Considering these basic differences and problems, special practices and educational institutions are needed in order to meet the educational needs of gifted students (Callahan, Moon, & Oh, 2017).

Identifying gifted children at an early age and educating them around their personal talents is important not only for the individual happiness of these children, but also for raising the quality of social life. During value acquisition process, gifted children form their identities and are affected by their surrounding (Hökelekli & Gündüz, 2004). Raising individuals with values is among the basic duties and expectations of any society. In particular, gifted students stand out in the context of their potential. Sezer (2016) states that families want their children to gain moral, national and universal values through education. It is of particular importance to understand the value orientations of gifted children and to reflect on values education since gifted children are interested in moral and spiritual issues from an early age. Renzulli (2020) emphasized the importance of supporting the moral development of these students. They differ from normal students in terms of some value judgments (Özbey & Sarıçam, 2019). The moral and spiritual potential of these children can prevent the moral corruption and erosion of values experienced in today's world and reach a virtuous society (Hökelekli and Gündüz, 2004). Hardy, Bean, and Olsen (2015) state that moral sensitivity is an indicator of how much importance is given to values and virtues.

Thinking the probability that gifted students can reach important positions in society to guide the society, it is important to know the values they have or to reveal the variables that affect the acquisition of these values. Once appropriate environmental conditions are offered to gifted individuals in terms of family, school, social environment, and so on, it will make overall significant contributions to their self-realization and moral sensitivity development (Özbey, 2016). According to Berkowitz and Hoppe (2009), gifted children have different characteristics compared to their peers, one of which is that they are more intellectual and outgoing. Yılmaz and Tortop (2018) pointed out that gifted students will be able to learn the values to be gained effectively and accurately thanks to their superior thinking power, and these values will enable them to develop positive attitudes and behaviors in their social skills. Hardy et al (2014) stated that these individuals tend to transform the truths that make up their personality into behavior. These social skills acquired by the gifted will play an important role in the realization of their social adaptation. Special talented students with high social responsibility levels have higher emotional intelligence than their peers (Khasawneh & Aldiabat, 2017; Özbey & Adam Karduz, 2018).

Gifted students are defined as individuals who learn faster than their peers, are ahead in creativity, art and leadership capacity, have special academic abilities, can understand abstract ideas, like to act independently in their interests, and perform at a high level, and those students are trained at SACs (MoNE, 2018). Training given at SACs consists of five programs, which are adaptation, support training, recognizing individual talents, developing special talents and project production/management. Students are given a "Certificate of Completion" upon completion of each program. SACs have been active as a part of the Ministry of National Education in Turkey since 2005 in order to improve the individual abilities of special students (painting, music and general mental ability) at the age of pre-school, primary school,

secondary school and high school in a way that does not disrupt their education in schools and to raise awareness. There are 279 SACs in 81 provinces of Turkey at service of eligible students (MoNE 2022). It is important to consider the social aspects (family structure, socio-economic status and special interests) of these students in addition to their experiences at school in the value acquisition process.

Problem of Study

Therefore, this study aimed at examining the value perceptions of gifted students at SACs in relation with a set of variables. In line with this, answer was sought to the following questions. The main problem of study is;

- What is the level of perceptions of gifted children towards values?

The sub-problems of the study are below;

- Is there any differences on gifted students' value perceptions according to sex?
- Is there any differences on gifted students' value perceptions according to grade level in formal education?
- Is there any differences on gifted students' value perceptions according to education level of their parents?
- Is there any differences on gifted students' value perceptions according to occupation of their parents?
- Is there any differences on gifted students' value perceptions according to TV program(s) they watch?
- Is there any differences on gifted students' value perceptions according to their interests (hobbies)?

Method

Research Design

This study was carried out in survey research design since it aims to analyze the value perceptions of gifted students studying in science and art centers in relation with different variables. Survey researchers are conducted on a sample that represents the population and reflects its characteristics (Fraenkel & Wallen, 2009). In that type of studies, the procedural steps are borrowed from quantitative research in order to describe the attitudes, views, behaviors or characteristics of the sample selected from the population (Creswell, 2012). For this reason, survey research design can be used in quantitative, qualitative or mixed methods research (Ponto, 2015)

Participants

SACs were opened for training gifted students in Turkey. Science and art center is defined as “the institution which provides support education services to students with special talents in the fields of general mental skills, visual arts or music in order to improve their abilities and enable them to use their capacities at the highest level while they attend formal educational institutions”. SAC appeals to students who are diagnosed to be gifted or talented at exams in the above-mentioned areas. In SACs, students are given training on their selected abilities on weekdays or weekends outside of formal education hours. In the scope of the training at these centers, project-based, interdisciplinary education programs and activities are organized by means of enrichment and acceleration depending on the abilities of the students for original end products, projects and productions (MoNE, 2018).

The population of the research consists of gifted students studying at SACs located in the Black Sea Region of Turkey. The study sample, which is paraphrased as “the part of the universe chosen to represent it” (Fraenkel & Wallen, 2009), was selected by using the maximum diversity sampling method among purposeful sampling methods. This method was preferred in order to understand whether "there are common or shared phenomena among diverse situations" (Yıldırım & Şimşek, 2011). Of the 15 SACs in the population, 14 could be contacted. As for the participants, 712 out of 2799 beneficiaries at these centers were included in the study. Demographic information about the study group is given in Table 1.

Table 1. Study Sample Demographics

Demographic Information		N
Gender	Female	363
	Male	349
Grade Level in Formal Education	5	105
	6	325
	7	176
	8	62
	9 and higher	44
SAC Program Studied	Support training	118
	Recognizing individual talents	361
	Developing special talents	204
	Project production/management	29
	Total	**712**

Data Collection Tool

In this research, Beldağ's (2012) "Perceptions for Values Scale" was used for collecting data (See Appendix). This scale is comprised of two parts. The first part contains personal information while part two includes statements about value perceptions. There are Likert-type items to be answered with one of the five options ("strongly disagree", "disagree", "undecided", "agree" and "strongly agree"). The items in the scale consist of the sub-dimensions of "Being Scientific, Patriotism, Peace, Fairness, Honesty, Aesthetics, Respect". The validity and reliability analyses of the " Perceptions for Values Scale" were conducted during this study and the following results were reached.

Validity and Reliability Analysis

Confirmatory factor analysis was performed to determine the level of validity of the measurement tool for this study. Confirmatory factor analysis is used to check whether a previously used scale fits the factorial structure of a new research study and, if so, to measure the extent it fits the original factor structure (Suhr, 2006). In other words, confirmatory factor analysis is applied to analyze the compatibility between the data and the theoretical structure and to test the suitability of the structure which was developed earlier (Seçer, 2017). In this scope, confirmatory factor analysis was performed to determine whether the " Perceptions for Values Scale" developed by Beldağ (2012) would be confirmed in the sample used in the current research. When it comes to the level of reliability, the Cronbach Alpha internal consistency coefficient was calculated.

The results of the confirmatory factor analysis for the Perceptions for Values Scale are presented in Figure 1.

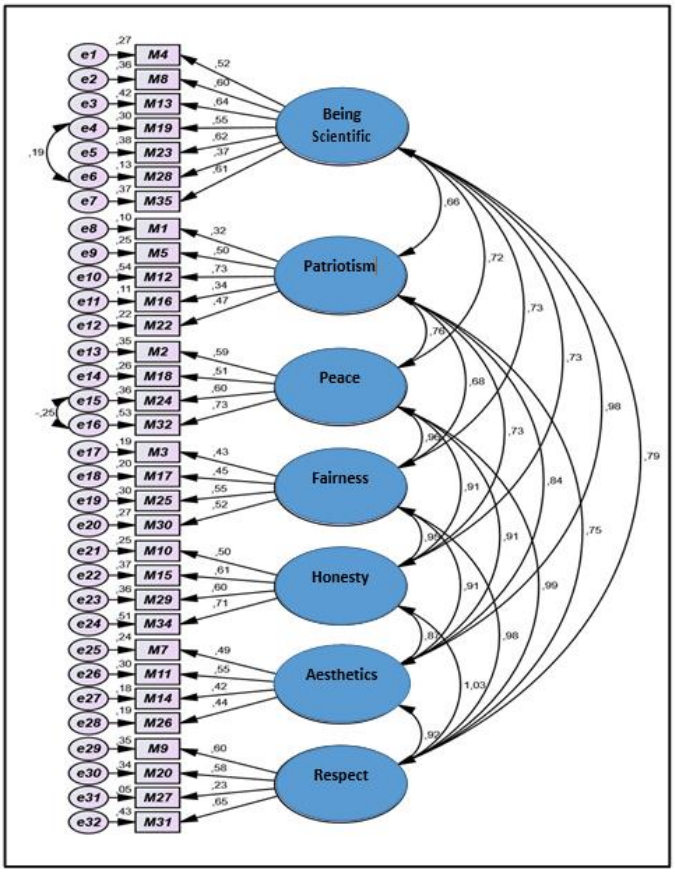

Figure 1. Confirmatory Factor Analysis for the Perceptions for Values Scale

As a result of the confirmatory factor analysis for the Perceptions for Values Scale, some items were excluded from the scale in order to obtain better goodness-of-fit values. These are Item 33 in *Patriotism* sub-scale, Item 21 in *Honesty* sub-scale, and Item 6 in *Peace* sub-scale. As a result, the goodness-of-fit values obtained for the scale were χ^2=1075.136; df=441; χ^2/df=2.438; GFI=.91; AGFI=.89; CFI=.90; RMSEA=0.45; SRMR= 0.45. These values suggest that the Perceptions for Values Scale has acceptable goodness-of-fit values (Bayram, 2010; Şimşek, 2007; Sümer, 2000).

During the scale development stages, the Cronbach Alpha reliability coefficient was calculated as .88. Even better, this feature was calculated as .90 in the present study. It means that the Perceptions for Values Scale is highly reliable.

Data Collection and Analysis

The "Perceptions for Values Scale" was applied to students attending 14 science and art centers in different provinces across the Black Sea Region. Collected data were analyzed with SPSS and AMOS. In the analysis of the data, t-test and One-Way Analysis of Variance were used as applicable for the characteristics of the variables. Skewness and kurtosis values were calculated to decide whether the variables had a normal distribution or not. The results are given in Table 2.

Table 2. Skewness and Kurtosis Values for Variables

Sub-scale/Total	Skewness	Kurtosis
Being Scientific	-,450	-,025
Patriotism	-1,862	4,780
Peace	-1,962	5,967
Fairness	-1,310	2,277
Honesty	-1,949	6,063
Aesthetics	-1,110	2,324
Respect	-1,288	2,718
Total	**-1,784**	**6,032**

As seen in Table 2, the kurtosis and skewness values of the sub-scales and the entire scale indicate a normal distribution. According to Kline (2015), skewness values below 3.0 and kurtosis values below 10.0 are considered sufficient for a normal distribution.

Results

Value perceptions of SAC students were analyzed in relation with gender, grade level, father's education level, mother's education level, household income, father's occupation, mother's occupation, TV program(s) watched, and interests. The findings obtained from the analyses are elaborated below.

Gifted Students' Value Perceptions by Gender

In order to find out whether SAC students' value acquisitions differ against the variable of gender, t-Test was conducted. The results are displayed in Table 3.

Table 3. T-Test Results regarding Gender

Values	Gender	n	$\overline{X}$	SS	t	SD	p
Being Scientific	Female	363	3.99	0.64	.853	710	.394
	Male	349	3.95	0.66			
Patriotism	Female	363	4.45	0.59	-.919	710	.358
	Male	349	4.49	0.57			
Peace	Female	363	4.49	0.56	1.843	710	.066
	Male	349	4.41	0.62			
Fairness	Female	363	4.36	0.66	2.853	710	.004**
	Male	349	4.22	0.69			
Honesty	Female	363	4.52	0.56	2.137	710	.033*
	Male	349	4.42	0.61			
Aesthetics	Female	363	4.17	0.63	.243	710	.808
	Male	349	4.15	0.65			
Respect	Female	363	4.32	0.56	1.699	710	.090
	Male	349	4.24	0.62			

**p<.01; *p<.05

According to Table 3, the variable of gender yielded no statistically significant results in the whole scale [$t_{(710)}=1.640; p>.05$] and in the sub-scales Being Scientific [$t_{(710)}=.853; p>.05$], Patriotism [$t_{(710)}=-.919; p>.05$], Peace [$t_{(710)}=1.843; p>.05$], Aesthetics [$t_{(710)}=.243; p>.05$], and Respect [$t_{(710)}=1.699; p>.05$]. When the significant differences were examined, value perception levels of female students were higher than those of male students in the sub-scales of Fairness [$t_{(710)}=-2.853; p<.05$] and Honesty [$t_{(710)}=2.137; p<.05$].

Gifted Students' Value Perceptions by Grade Level

One-Way Analysis of Variance was conducted to determine whether the value acquisitions of SAC students differ against the grade level they attend. The results are shown in Table 4.

Table 4. ANOVA Results regarding Grade Level

Value	Grade Level	n	$\overline{X}$	SS	SD	F	p	LSD
Being Scientific	5 (1)	105	3.99	.69	4	.815	.516	-
	6 (2)	325	3.97	.63	707			
	7 (3)	176	3.94	.64	711			
	8 (4)	62	4.08	.59				
	9 and higher (5)	44	3.87	.74				
Patriotism	5 (1)	105	4.42	.62	4	3.725	.005	4>5
	6 (2)	325	4.48	.52	707			1>5
	7 (3)	176	4.54	.56	711			
	8 (4)	62	4.43	.60				
	9 and higher (5)	44	4.18	.84				
Peace	5 (1)	105	4.51	.63	4	2.908	.021	1>5
	6 (2)	325	4.48	.53	707			2>5
	7 (3)	176	4.42	.60	711			
	8 (4)	62	4.46	.61				

	9 and higher (5)	44	4.18	.76				
Fairness	5 (1)	105	4.34	.68	4	3.585	.007	-
	6 (2)	325	4.32	.66	707			
	7 (3)	176	4.22	.70	711			
	8 (4)	62	4.44	.46				
	9 and higher (5)	44	4.01	.85				
Honesty	5 (1)	105	4.55	.62	4	1.936	.103	-
	6 (2)	325	4.46	.56	707			
	7 (3)	176	4.46	.61	711			
	8 (4)	62	4.58	.39				
	9 and higher (5)	44	4.31	.80				
Aesthetics	5 (1)	105	4.31	.64	4	2.643	.033	1>5
	6 (2)	325	4.16	.64	707			4>5
	7 (3)	176	4.09	.65	711			
	8 (4)	62	4.19	.57				
	9 and higher (5)	44	4.00	.64				
Respect	5 (1)	105	4.34	.69	4	1.579	.178	-
	6 (2)	325	4.26	.58	707			
	7 (3)	176	4.31	.56	711			
	8 (4)	62	4.33	.40				
	9 and higher (5)	44	4.10	.74				

As seen in Table 4, the variable of grade level was seen to yield nonsignificant difference in the whole scale [$F_{(4-707)}= 2.729; p>.05$] and in sub-scales of Being Scientific [$F_{(4-707)}= .815; p>.05$], Fairness [$F_{(4-707)}= 3.585; p>.05$], Honesty [$F_{(4-707)}= 1.936; p>.05$], and Respect [$F_{(4-707)}= 1.579; p>.05$]. However, the difference was statistically significant for Patriotism [$F_{(4-707)}= 3.725; p<.05$], Peace [$F_{(4-707)}= 2.908; p<.05$], and Aesthetics [$F_{(4-707)}= 2.643; p<.05$]. A closer look at the significant difference reveals that the participants attending the eighth grade [$\overline{X}=4.43$] had higher perceptions under the dimension of Being Scientific compared to those at the ninth grade or above [$\overline{X}=4.18$]. In addition, the perceptions of the participants attending the fifth grade [$\overline{X}=4.42$] were higher than the perceptions of those at and above the ninth grade [$\overline{X}=4.18$]. In another sub-scale, Peace, it was seen that the fifth-graders [$\overline{X}=4.51$] had higher perceptions than those at and above the ninth grade [$\overline{X}=4.18$]. Again, the perceptions of students attending the sixth grade [$\overline{X}=4.48$] were higher than those at and above the ninth grade [$\overline{X}=4.18$]. Under the sub-scale of Aesthetics, the fifth-graders [$\overline{X}=4.31$] showed higher perception levels than those at and above the ninth grade [$\overline{X}=4.00$]. The participants at the eighth grade also [$\overline{X}=4.19$] showed higher perceptions than those attending the ninth grade and above [$\overline{X}=4.00$]. These findings suggest that SAC students' perceptions of being scientific, peace and aesthetics decrease as their grade level increases.

Gifted Students' Value Perceptions by Father's Education Level

One-Way Analysis of Variance was conducted in order to find out whether the value acquisitions of BİLSEM students differ in relation with their father's level of education. The results are presented in Table 5 below.

Table 5. ANOVA Results regarding Father's Education Level

Value	Father's Education Level	n	$\overline{X}$	SS	SD	F	p	LSD
Being Scientific	Primary School (1)	27	4.07	.60	4	.523	.719	-
	Secondary School (2)	42	3.98	.71	707			
	High School (3)	147	3.97	.57	711			
	University (4)	390	3.95	.68				
	Postgraduate (5)	106	4.03	.60				
Patriotism	Primary School (1)	27	4.68	.31	4	2.028	.089	-
	Secondary School (2)	42	4.54	.47	707			
	High School (3)	147	4.53	.57	711			

	University (4)	390	4.43	.58				
	Postgraduate (5)	106	4.41	.66				
	Primary School (1)	27	4.58	.57	4	.449	.216	-
	Secondary School (2)	42	4.56	.51	707			
Peace	High School (3)	147	4.45	.60	711			
	University (4)	390	4.41	.63				
	Postgraduate (5)	106	4.51	.43				
	Primary School (1)	27	4.37	.75	4	.157	.960	-
	Secondary School (2)	42	4.27	.64	707			
Fairness	High School (3)	147	4.28	.65	711			
	University (4)	390	4.30	.69				
	Postgraduate (5)	106	4.26	.68				
	Primary School (1)	27	4.61	.42	4	.889	.470	-
	Secondary School (2)	42	4.55	.60	707			
Honesty	High School (3)	147	4.50	.52	711			
	University (4)	390	4.44	.63				
	Postgraduate (5)	106	4.47	.56				
	Primary School (1)	27	4.28	.61	4	.795	.529	-
	Secondary School (2)	42	4.27	.54	707			
Aesthetics	High School (3)	147	4.18	.60	711			
	University (4)	390	4.13	.68				
	Postgraduate (5)	106	4.16	.60				
	Primary School (1)	27	4.43	.46	4	.828	.508	-
	Secondary School (2)	42	4.26	.56	707			
Respect	High School (3)	147	4.30	.57	711			
	University (4)	390	4.25	.63				
	Postgraduate (5)	106	4.33	.53				

Table 5 shows that there was no statistically significant difference regarding the variable of father's education level in the whole scale [$F_{(4-707)}= .967; p>.05$] and in sub-scales of Being Scientific [$F_{(4-707)}= .523; p>.05$], Patriotism [$F_{(4-707)}= .2.028; p>.05$], Peace [$F_{(4-707)}= .449; p>.05$], Fairness [$F_{(4-707)}= .157; p>.05$], Honesty [$F_{(4-707)}= .889; p>.05$], Aesthetics [$F_{(4-707)}= .795; p>.05$], and Respect [$F_{(4-707)}= .828; p>.05$].

Gifted Students' Value Perceptions by Mother's Education Level

One-Way Analysis of Variance was conducted in order to find out whether the value acquisitions of BİLSEM students differ in relation with their mother's level of education. The results are presented in Table 6.

Table 6. ANOVA Results regarding Mother's Education Level

Value	Mother's Education Level	n	$\overline{X}$	SS	SD	F	p	LSD
	Primary School (1)	68	4.01	.60	4	1.392	.235	-
	Secondary School (2)	50	4.12	.56	707			
Being Scientific	**Lise (3)**	192	3.94	.62	711			
	University (4)	335	3.93	.67				
	Postgraduate (5)	67	4.06	.66				
	Primary School (1)	68	4.57	.44	4	3.773	.005	1>4
	Secondary School (2)	50	4.49	.52	707			3>4
Patriotism	**Lise (3)**	192	4.56	.53	711			
	University (4)	335	4.38	.64				
	Postgraduate (5)	67	4.48	.54				
	Primary School (1)	68	4.43	.54	4	1.541	.189	-
	Secondary School (2)	50	4.57	.52	707			
Peace	**Lise (3)**	192	4.51	.59	711			
	University (4)	335	4.40	.61				
	Postgraduate (5)	67	4.45	.57				
	Primary School (1)	68	4.29	.69	4	.841	.500	-
Fairness	**Secondary School (2)**	50	4.28	.62	707			
	Lise (3)	192	4.36	.63	711			

	University (4)	335	4.25	.71				
	Postgraduate (5)	67	4.27	.65				
	Primary School (1)	68	4.53	.52	4	.537	.709	-
	Secondary School (2)	50	4.47	.73	707			
Honesty	**Lise (3)**	192	4.51	.54	711			
	University (4)	335	4.44	.60				
	Postgraduate (5)	67	4.47	.64				
	Primary School (1)	68	4.23	.55	4	2.028	.089	-
	Secondary School (2)	50	4.27	.52	707			
Aesthetics	**Lise (3)**	192	4.23	.58	711			
	University (4)	335	4.09	.70				
	Postgraduate (5)	67	4.14	.66				
	Primary School (1)	68	4.33	.53	4	.780	.539	-
	Secondary School (2)	50	4.33	.57	707			
Respect	**Lise (3)**	192	4.31	.57	711			
	University (4)	335	4.24	.62				
	Postgraduate (5)	67	4.30	.58				

As can be seen in Table 6, there was no statistically significant difference regarding the variable of mother's education level in the whole scale [$F_{(4-707)}=1.760; p>.05$] and sub-scales of Being Scientific [$F_{(4-707)}=1.392; p>.05$], Peace [$F_{(4-707)}= 1.541; p>.05$], Fairness [$F_{(4-707)}= .841; p>.05$], Honesty [$F_{(4-707)}= .537; p>.05$], Aesthetics [$F_{(4-707)}= 2.028; p>.05$], and Respect [$F_{(4-707)}= .780; p>.05$], while significant difference was found under Patriotism [$F_{(707)}= 3.773; p<.05$]. When the significant difference was examined, it was seen that patriotism perceptions were higher among participants whose mothers are graduates of Primary School [$\overline{X}=4.57$] compared to those whose mothers are graduates of university [$\overline{X}=4.38$]. In a similar vein, the participants whose mothers are graduates of high school [$\overline{X}=4.56$] showed higher value perceptions than university graduates [$\overline{X}=4.36$]. These findings suggest that BİLSEM students achieve patriotism value at a lower level as mother's education level increases.

Gifted Students' Value Perceptions by Father's Occupation

One-Way Analysis of Variance was conducted in order to find out whether the value acquisitions of the participants differ in relation with their father's occupation. The results are shown in Table 7.

Table 7. ANOVA Results regarding Father's Occupation

Values	Father's Occupation	n	$\overline{X}$	SS	SD	F	p	LSD
	Worker (1)	72	3.99	.63	4	.856	.490	-
	Civil Servant (2)	423	4.00	.65	707			
Being Scientific	Tradespeople (3)	57	3.94	.62	711			
	Retired (4)	38	3.84	.72				
	Self-employed (5)	122	3.91	.62				
	Worker (1)	72	4.56	.48	4	.626	.644	-
	Civil Servant (2)	423	4.46	.58	707			
Patriotism	Tradespeople (3)	57	4.41	.65	711			
	Retired (4)	38	4.42	.62				
	Self-employed (5)	122	4.47	.60				
	Worker (1)	72	4.57	.45	4	2.545	.038	1>4
	Civil Servant (2)	423	4.44	.58	707			5>4
Peace	Tradespeople (3)	57	4.42	.63	711			
	Retired (4)	38	4.21	.81				
	Self-employed (5)	122	4.49	.59				
	Worker (1)	72	4.36	.58	4	.475	.754	-
	Civil Servant (2)	423	4.30	.69	707			
Fairness	Tradespeople (3)	57	4.21	.72	711			
	Retired (4)	38	4.25	.64				

	Self-employed (5)	122	4.28	.67				
Honesty	Worker (1)	72	4.56	.49	4	2.252	.062	-
	Civil Servant (2)	423	4.47	.59	707			
	Tradespeople (3)	57	4.27	.79	711			
	Retired (4)	38	4.48	.49				
	Self-employed (5)	122	4.51	.56				
Aesthetics	Worker (1)	72	4.24	.61	4	.559	.693	-
	Civil Servant (2)	423	4.14	.65	707			
	Tradespeople (3)	57	4.17	.68	711			
	Retired (4)	38	4.09	.60				
	Self-employed (5)	122	4.19	.61				
Respect	Worker (1)	72	4.31	.47	4	.244	.913	-
	Civil Servant (2)	423	4.28	.61	707			
	Tradespeople (3)	57	4.22	.61	711			
	Retired (4)	38	4.24	.64				
	Self-employed (5)	122	4.29	.58				

As in Table 7, the variable of father's occupation yielded nonsignificant difference in the whole scale [$F_{(4-707)}= .964; p>.05$] and in sub-scales of Being Scientific [$F_{(4-707)}= .856; p>.05$], Patriotism [$F_{(4-707)}= .626; p>.05$], Fairness [$F_{(4-707)}= .475; p>.05$], Honesty [$F_{(4-707)}= 2.252; p>.05$], Aesthetics [$F_{(4-707)}= .559; p>.05$], and Respect [$F_{(4-707)}= .244; p>.05$]. However, there was significant difference in Peace [$F_{(4-707)}= 2.545; p<.05$]. A closer look at the significant difference showed that the individuals who had worker fathers [$\overline{X}=4.57$] had higher perceptions than those whose fathers are retired [$\overline{X}=4.21$] under the dimension of Peace. Again, children of self-employed fathers [$\overline{X}=4.49$] showed higher perceptions than those whose fathers are retired [$\overline{X}=4.21$].

Gifted Students' Value Perceptions by Mother's Occupation

One-Way Analysis of Variance was conducted in order to find out whether the value acquisitions of the participants differ in relation with their mother's occupation. The results are shown in Table 8.

Table 8. ANOVA Results regarding Mother's Occupation

Values	Mother's Occupation	n	$\overline{X}$	SS	SD	F	p	LSD
Being Scientific	Worker (1)	29	3.80	.60	5	1.938	.086	-
	Civil Servant (2)	327	3.95	.68	706			
	Tradespeople (3)	12	3.90	.69	711			
	Retired (4)	14	3.86	.63				
	Unemployed (5)	264	3.96	.61				
	Self-employed (6)	66	4.18	.56				
Patriotism	Worker (1)	29	4.42	.52	5	.954	.445	-
	Civil Servant (2)	327	4.42	.59	706			
	Tradespeople (3)	12	4.46	.41	711			
	Retired (4)	14	4.35	.77				
	Unemployed (5)	264	4.51	.59				
	Self-employed (6)	66	4.53	.51				
Peace	Worker (1)	29	4.54	.42	5	1.366	.235	-
	Civil Servant (2)	327	4.41	.63	706			
	Tradespeople (3)	12	4.52	.44	711			
	Retired (4)	14	4.28	.84				
	Unemployed (5)	264	4.46	.56				
	Self-employed (6)	66	4.57	.47				
Fairness	Worker (1)	29	4.32	.53	5	1.151	.332	-
	Civil Servant (2)	327	4.23	.73	706			
	Tradespeople (3)	12	4.37	.41	711			
	Retired (4)	14	4.23	.61				
	Unemployed (5)	264	4.33	.65				
	Self-employed (6)	66	4.42	.60				
Honesty	Worker (1)	29	4.57	.41	5	1.625	.151	-

	Civil Servant (2)	327	4.41	.63	706			
	Tradespeople (3)	12	4.43	.61	711			
	Retired (4)	14	4.48	.44				
	Unemployed (5)	264	4.50	.57				
	Self-employed (6)	66	4.61	.54				
Aesthetics	Worker (1)	29	4.20	.66	5	2.208	.052	-
	Civil Servant (2)	327	4.09	.68	706			
	Tradespeople (3)	12	4.22	.71	711			
	Retired (4)	14	4.14	.60				
	Unemployed (5)	264	4.20	.59				
	Self-employed (6)	66	4.35	.54				
Respect	Worker (1)	29	4.29	.50	5	1.973	.081	-
	Civil Servant (2)	327	4.23	.64	706			
	Tradespeople (3)	12	4.47	.52	711			
	Retired (4)	14	4.05	.59				
	Unemployed (5)	264	4.30	.55				
	Self-employed (6)	66	4.43	.52				

According to One-Way Variance results regarding the variable of mother's occupation, BİLSEM students did not show significant difference in the sum of the scale [$X^2_{(5)}$= *2.142; p>.05*] and in sub-scales of Being Scientific [$F_{(706)}$= *1.938; p>.05*], Patriotism [$F_{(706)}$= *.954; p>.05*], Peace [$F_{(706)}$= *1.366; p>.05*], Fairness [$F_{(706)}$= *1.151; p>.05*], Honesty [$F_{(706)}$= *1.625; p>.05*], Aesthetics [$F_{(706)}$= *2.208; p>.05*], and Respect [$F_{(706)}$= *. 1.973; p>.05*].

Gifted Students' Value Perceptions by TV Program(s) Watched

Again, One-Way Analysis of Variance was conducted to see whether SAC students have different perceptions depending on the TV program(s) they watch. The findings are shown in Table 9 below.

Table 9. ANOVA Results regarding TV Program(s) Watched

Values	TV Program(s) Watched	n	$\overline{X}$	SS	SD	F	p	LSD
Being Scientific	Movie (1)	225	3.92	.63	8	4.023	.000	6>7
	TV Series (2)	162	3.87	.70	703			3>7
	Documentary (3)	161	4,15	.57	711			
	Magazine (4)	10	3.88	.48				
	Sports (5)	77	4.06	.65				
	News (6)	23	4.19	.51				
	Cartoons (7)	21	3.59	.67				
	Contest (8)	19	3.72	.69				
	Nothing (9)	14	3.94	.68				
Patriotism	Movie (1)	225	4.44	.58	8	2.481	.012	5>9
	TV Series (2)	162	4.48	.57	703			6>9
	Documentary (3)	161	4.45	.62	711			
	Magazine (4)	10	4.54	.53				
	Sports (5)	77	4.67	.43				
	Haber (6)	23	4.57	.50				
	Cartoon (7)	21	4.28	.56				
	Contest (8)	19	4.29	.55				
	Nothing (9)	14	4.11	.87				
Peace	Movie (1)	225	4.41	.56	8	.509	.850	-
	TV Series (2)	162	4.45	.64	703			
	Documentary (3)	161	4.50	.56	711			
	Magazine (4)	10	4.45	.34				
	Sports (5)	77	4.50	.57				
	Haber (6)	23	4.30	.82				
	Cartoon (7)	21	4.47	.68				
	Contest (8)	19	4.39	.61				
	Nothing (9)	14	4.44	.53				

	Movie (1)	225	4.23	.68	8	.547	.822	-
	TV Series (2)	162	4.30	.74	703			
	Documentary (3)	161	4.32	.66	711			
	Magazine (4)	10	4.37	.42				
Fairness	Sports (5)	77	4.35	.67				
	Haber (6)	23	4.42	.49				
	Cartoon (7)	21	4.27	.69				
	Contest (8)	19	4.38	.51				
	Nothing (9)	14	4.17	.83				
	Movie (1)	225	4.46	.59	8	.707	.686	-
	TV Series (2)	162	4.46	.64	703			
	Documentary (3)	161	4.50	.56	711			
	Magazine (4)	10	4.57	.28				
Honesty	Sports (5)	77	4.52	.53				
	Haber (6)	23	4.58	.43				
	Cartoon (7)	21	4.35	.81				
	Contest (8)	19	4.40	.59				
	Nothing (9)	14	4.21	.58				
	Movie (1)	225	4.14	.61	8	1.721	.090	-
	TV Series (2)	162	4.09	.68	703			
	Documentary (3)	161	4.25	.65	711			
	Magazine (4)	10	4.42	.40				
Aesthetics	Sports (5)	77	4.20	.64				
	Haber (6)	23	4.39	.51				
	Cartoon (7)	21	3.96	.73				
	Contest (8)	19	4.09	.49				
	Nothing (9)	14	3.94	.82				
	Movie (1)	225	4.24	.58	8	1.350	.216	-
	TV Series (2)	162	4.32	.60	703			
	Documentary (3)	161	4.34	.58	711			
	Magazine (4)	10	4.35	.48				
Respect	Sports (5)	77	4.26	.61				
	Haber (6)	23	4.33	.57				
	Cartoon (7)	21	4.08	.70				
	Contest (8)	19	4.30	.45				
	Nothing (9)	14	3.94	.67				

As can be seen in Table 9, it was found out that the students' value perceptions were not significantly different against the TV program(s) they watch in the whole scale [$F_{(8-703)}= 1.422; p>.05$] and in sub-scales of Peace [$F_{(8-703)}= .509; p>.05$], Fairness [$F_{(8-703)}= .547; p>.05$], Honesty [$F_{(8-703)}= .707; p>.05$], Aesthetics [$F_{(8-703)}= 1.721; p>.05$], and Respect [$F_{(8-703)}= . 1.350; p>.05$]. However, a significant difference was found under the dimensions of Being Scientific [$F_{(8-703)}= 4.023; p<.05$] and Patriotism [$F_{(8-703)}= 2.481; p<.05$]. More specifically, the participants who watch news [$\overline{X}=4.19$] had higher value perceptions of being scientific than those watching cartoons [$\overline{X}=3.59$]. Moreover, the participants watching documentaries [$\overline{X}=4,15$] had higher levels of value perceptions compared to those watching cartoons [$\overline{X}=3.59$]. Under another dimension, Patriotism, it was seen that the students who follow sports shows [$\overline{X}=4.67$] had higher value perceptions than those who do not watch TV at all [$\overline{X}=4.11$]. Another finding is that the individuals watching news [$\overline{X}=4.57$] had higher value perceptions than peers who do not watch TV at all [$\overline{X}=4.11$].

Gifted Students' Value Perceptions by Interests

The students' value perceptions were analyzed against their interests by applying One-Way Analysis of Variance. The results are displayed in Table 10 below.

Table 10. ANOVA Results regarding Interests

Values	Interest	n	$\overline{X}$	SS	SD	F	p	LSD
Being Scientific	Sports (1)	218	3.94	.66	5	3.187	.007	3>5
	Music (2)	99	3.92	.73	706			4>5
	Books (3)	206	4.06	.58	711			
	Painting (4)	103	4.06	.61				
	TV (5)	43	3.73	.61				
	Computers (6)	43	3.81	.69				
Patriotism	Sports (1)	218	4.52	.56	5	1.600	.158	-
	Music (2)	99	4.37	.71	706			
	Books (3)	206	4.48	.55	711			
	Painting (4)	103	4.46	.52				
	TV (5)	43	4.31	.69				
	Computers (6)	43	4.51	.50				
Peace	Sports (1)	218	4.41	.62	5	3.354	.005	-
	Music (2)	99	4.34	.74	706			
	Books (3)	206	4.50	.53	711			
	Painting (4)	103	4.59	.46				
	TV (5)	43	4.47	.47				
	Computers (6)	43	4.25	.64				
Fairness	Sports (1)	218	4.24	.73	5	1.805	.110	-
	Music (2)	99	4.34	.71	706			
	Books (3)	206	4.35	.65	711			
	Painting (4)	103	4.37	.58				
	TV (5)	43	4.16	.65				
	Computers (6)	43	4.12	.65				
Honesty	Sports (1)	218	4.43	.62	5	1.781	.114	-
	Music (2)	99	4.44	.73	706			
	Books (3)	206	4.52	.52	711			
	Painting (4)	103	4.58	.48				
	TV (5)	43	4.38	.61				
	Computers (6)	43	4.34	.57				
Aesthetics	Sports (1)	218	4.13	.63	5	4.776	.000	4>6
	Music (2)	99	4.07	.69	706			3>6
	Books (3)	206	4.27	.58	711			
	Painting (4)	103	4.30	.61				
	TV (5)	43	3.94	.68				
	Computers (6)	43	3.93	.69				
Respect	Sports (1)	218	4.21	.62	5	3.652	.003	3>6
	Music (2)	99	4.24	.69	706			4>6
	Books (3)	206	4.39	.52	711			
	Painting (4)	103	4.36	.54				
	TV (5)	43	4.16	.55				
	Computers (6)	43	4.11	.62				

As Table 10 shows, there was found no significant difference in value perceptions against hobbies in the whole scale [$F_{(5-706)}=3.533; p>.05$] and in sub-scales of Patriotism [$F_{(5-706)}= 1.600; p>.05$], Peace [$F_{(5-706)}= 3.354; p>.05$], Fairness [$F_{(5-706)}= 10.570; p>.05$], and Honesty [$F_{(5-706)}= 9.293; p>.05$], while there were significant difference under the sub-scales of Being Scientific [$F_{(5-706)}= 3.187; p<.05$], Aesthetics [$F_{(5-706)}= 4.776; p<.05$], and Respect [$F_{(5-706)}= 3.652; p<.05$]. In the significant differences, the following highlights were noted. The individuals who are into books showed higher value perceptions [$\overline{X}=4.06$] than those who are interested in watching television [$\overline{X}=3.73$] regarding the value of Being Scientific. Furthermore, the students who are interested in painting [$\overline{X}=4.06$] showed higher value acquisitions than those interested in watching TV [$\overline{X}=3.73$]. Under the dimension of Aesthetics, value perceptions appeared higher

among those interested in painting [$\overline{X}$ =4.30] compared to those who are into computers [$\overline{X}$ =3.93]. Likewise, the participants interested in books [$\overline{X}$ =4.27] had higher value acquisitions than those who are into computers [$\overline{X}$ =3.93]. As another comparison, the scores from Respect were higher among those who like reading books [$\overline{X}$ =4.39] compared to peers who like computers [$\overline{X}$ =4.11]. Finally, the respondents who are interested in painting [$\overline{X}$ =4.36] had higher value acquisitions than those interested in computers [$\overline{X}$ =4.11].

Discussion and Conclusion

This study was carried out to investigate value perceptions of gifted students studying in BİLSEMs against a set of variables. The results are discussed in reference to the existing literature.

To start with, gifted students' value acquisitions were looked for both genders. It was seen that females have higher perception levels of *fairness* and *honesty*, while females and males are at a similar level of perceptions regarding other values, which are *being scientific, patriotism, peace*, *aesthetics*, and *respect*. In the related literature, Oğuz Namdar and Akbayrak (2019) concluded that drama practices increased gifted students' conceptual awareness of the value of justice at a significant level and that the students were able to associate the concept with daily life besides defining and exemplifying that value. Umar (2018) found that gifted girls and boys do not vary significantly in universal moral values. Ayverdi (2021) concluded that there is no significant difference between female and male students' attitudes towards environmental values. On the contrary, Topçu (2015) noted that gifted students mostly define values in a sociological context and there are gender differences in the way they perceive values. The related literature reports both consistent and divergent findings concerning the variable of gender. This can be explained with respondents' social, cultural and economic context as well as the effect of the media/social-media, which has an important place in the lives of the students today, and varying perception levels of individuals of the same age in addition to students' dissimilar interests (Camcı, 2011; Roper & Silverman, 2009).

Secondly, the present study revealed that students' value acquisitions differ at different grade levels. More particularly, this variable seems to be effective on three of the values in the scale: *patriotism*, *peace* and *aesthetics*. As the grade level increases, the gifted students' perception of patriotism, peace and aesthetics get lower. Umar (2018) found that while the average score of children aged 12-13 in universal moral values was the lowest, children aged 10-11 obtained the highest scores in the same scale. Roper and Silverman (2009) can be helpful in explaining this finding. The authors pointed out that as well as the intelligence levels of gifted students, their moral interests develop at earlier ages and more clearly than their peers.

In addition to the foregoing, parents' views on values education seem to matter. They regard values education important so they find the value education activities at BİLSEMs partially sufficient (Sezer, 2016). In the same direction, Avcu and Yaman (2022) underline the positive effect of families' participation in values education activities. Educational level of the father does not seem to be an influential factor on value acquisition of gifted students. This finding was almost repeated when it came to the mother's education level. This variable affects the perceptions regarding patriotism among all other sub-scales. In other words, mothers' education level is a powerful variable for the acquisition of the value of patriotism. Research by Türk and Nalçacı (2011) is in conformity with this finding. The finding finds further support from the literature on parents' education level. Umar (2018) and Ayverdi (2021) concluded that value acquisition is not affected from the father's educational status. As regards parents' occupations as a potential factor on value acquisition, the father's occupation seems to influence *peace* among other values. As reported in the relevant table above, the respondents whose fathers are workers or self-employed perceive the value of peace at a higher level than those whose fathers are retired. On the contrary, the mother's occupation does not seem to affect the respondents' value acquisition. Similarly, Umar (2018) found that gifted students' acquisition of universal moral values differs in cases their fathers are workers or civil servants, but the same generalization cannot be made for the mother's profession. It should be recalled that demographic characteristics matter in appraising the effect of parents' educational status and profession on the value acquisition of gifted students. In the current research, the mothers' lower level of education and the high number of unemployed mothers may have directly affected the result. In this regard, one of the most striking points is that value

acquisitions of the students whose mothers are primary school and high school graduates are higher than those whose mothers studied at university. In the evaluation of this result, parents' engagement or nonengagement in business life should be taken into account. As it can be seen from the demographic data, it seems worth noting that the study sample includes a considerably high number of mothers who do not have a job.

As another result, type of television programs seems to be a meaningful variable in gifted students' value acquisition. It is not surprising that the students who follow documentaries and news exhibit higher acquisition levels of *Being Scientific* compared to those watching cartoons. Additionally, it was seen that watchers of sports and news showed hold higher perceptions of *Patriotism* compared to those who do not watch TV at all. This could be due to the increased awareness about the realities of the world and the country as a result of watching news shows. Besides, the showing of national competitions in sporting programs might be a determiner of acquisition of the value of patriotism.

As the last topic of discussion, Girgin and Satmaz (2019) assert that organizing scientific conversations at a regular basis helps gifted students *Be Scientific*. Also, Sak (2017) drew attention to the importance of enriching the learning processes of gifted students through seminars, conferences and different types of projects. Various activities are available outside school so that gifted students can engage in in their spare time. These activities are also useful for value acquisition. Hébert and Smith (2018) emphasized the importance of supporting the socio-emotional aspects of gifted students. In this regard, the present study reported that interest (hobby) is an influential variable in acquisition of values of *Being Scientific, Aesthetics* and *Respect*. In this scope, it is an expected result that television viewers have a lower perception of the *Being Scientific* than those who read books and paint. It can be inferred that reading books and engaging in painting have a positive effect on developing a scientific attitude. In support of this, Berkowitz and Hoppe (2009) pointed out that the intellectual and social aspects of gifted children are much more prominent. Avcu and Yaman (2022) concluded that biography-aided differentiated education practices positively affect the value development of gifted students. It is thus essential to make such practices more widespread. In this case, it seems vital to diversify special interests of gifted children and provide sound guidance for them for the development of their social features.

Recommendations

In light of the study results, the following recommendations were proposed for the field and decision-makers.

- As SAC students move away from awareness of values as their grade levels increase, it is necessary to include more values education practices in the training contents of SAC. In addition, applied trainings and projects should be run for teachers working in SACs so that values education practices can be carried out satisfactorily as planned before.
- Departing from the proposition values education cannot be complete at school, families should take a role as stakeholders and they should be invited to informing seminars.
- Guidance should be given to students for watching movies, reading books or doing activities featuring various aspects that support values education practices. As a result, students' value acquisition is likely to escalate.
- In order for schools to take a more active role in the acquisition of values, physical facilities should be rearranged accordingly and awareness of all school personnel about the value acquisition processes should be raised.

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Ethical Standards

Ethical approval of the study was obtained from the Social and Human Sciences Ethics Committee of Recep Tayyip Erdogan University (2022/86).

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Appendix 1. Perceptions for Values Scale (Turkish Version)

Değerlere Yönelik Algılar Ölçeği						
Açıklama: Bu ölçek sizin değerlere yönelik algınızı ölçmek için geliştirilmiştir. Aşağıdaki ifadelere katılma durumunuza uygun olan kutucuğu işaretleyiniz. Kesinlikle Katılmıyorum 1 Katılmıyorum 2 Kararsızım 3 Katılıyorum 4 Kesinlikle Katılıyorum 5						
No	Maddeler	**1**	**2**	**3**	**4**	**5**
1	Vatan toprağı için savaşmak anlamsızdır.*					
2	Ortak sorunlarımızı bir araya gelerek çözmeliyiz.					
3	Yakın arkadaşımız da olsa haksız olduklarında uyarmalıyız.					
4	Deneylerden sonra, öğrendiklerimizi açıklamak bize zevk verir.					
5	Bu ülkenin vatandaşı olduğumuz için gurur duymalıyız.					
6	Arkadaşlarımın kavga etmesi beni üzer.					
7	Farklı kültürlerin tarihi eserlerini de korumalıyız.					
8	Bilimsel içerikli sergiler gezilmelidir.					
9	Arkadaşlarımızın düşüncelerine katılmasak bile onları sonuna kadar dinlemeliyiz.					
10	Sonuçları olumsuz olsa bile doğruları söylemeliyiz.					
11	Tarihi eserleri gezmek insana huzur verir.					
12	Milli bayramlar bize vatanın önemini hatırlatır.					
13	Bir olaya etki eden etmenleri araştırmalıyız.					
14	Tarihi eserler, görüntü kirliliğine neden olmaktadır.*					
15	Sözlerimiz ve davranışlarımız birbiriyle tutarlı olmalıdır.					
16	Günümüzde vatanın önemi kalmamıştır.*					
17	Kantin kuyruğunda sıra beklenmelidir.					
18	Barış yanlısı ülkeler daha huzurludur.					
19	Doğa olaylarının nasıl oluştuğunu öğrenmek isteriz.					
20	Küçükler, büyüklere saygı göstermelidir.					
21	Zor durumda kalırsam hırsızlık yaparım.*					
22	Vatanını seven kişi işini en iyi yapan kişidir.					
23	Öğrendiklerimizle ilgili deney yapmalıyız.					
24	Arkadaşlar arasındaki anlaşmazlıkların çözülmesine yardımcı olunmalıdır.					
25	Adaletin olmadığı yerde huzursuzluk (kargaşa) vardır.					
26	Çevremizdeki her şey düzenli olmalıdır.					
27	İnsanlar düşüncelerini kendilerine saklamalıdır.*					
28	Çevremizdeki doğa olaylarını sorgulamalıyız.					
29	Kimse doğruluktan ayrılmamalıdır.					
30	Sınıfta alınan kararlar sınıftaki çoğunluğun görüşünü kapsamalıdır.					
31	Arkadaşlık ilişkileri, birbirine saygılı olmayı gerektirir.					
32	Bütün insanlar barış içinde yaşamalıdır.					
33	Vatan toprağı bizim için değerlidir.					
34	Bulduğumuz değerli eşyaları sahiplerine ulaştırmaya çalışmalıyız.					
35	Öğrendiklerimizi günlük hayatta uygulamalıyız.					

*Ters maddeler : 1,14,16,21,27

Appendix 2. Perceptions for Values Scale (English Version)

Perceptions for Values Scale						
Description: This scale was developed to measure your perception of values. Tick the box that corresponds to your agreement with the following statements. Strongly dissagre 1 Dissagree 2 Undecided 3 Agree 4 Strongly Agree 5						
No	Items	**1**	**2**	**3**	**4**	**5**
1	Fighting for the homeland is meaningless*					
2	We should come together to solve our common problems.					
3	We should warn one when s/he is wrong even if s/he is our close friend.					
4	We enjoy explaining what we have learned after experiments.					
5	We should be proud to be citizens of this country.					
6	It upsets me when my friends fight.					
7	We should also protect the historical artifacts of other cultures.					
8	Scientific exhibitions should be visited.					
9	We should listen to our friends to the end even if we disagree with what they say.					
10	We should tell the truth even if the consequences are bad.					
11	Visiting historical monuments gives peace of mind.					
12	National holidays remind us of the importance of the homeland.					
13	We should investigate the factors that influence a happening.					
14	Historical artifacts cause visual pollution.*					
15	Our words and actions should be consistent with each other.					
16	Homeland is not important today.*					
17	Queue should be followed at the canteen.					
18	Peace-loving countries are more peaceful.					
19	We want to learn how natural phenomena occur.					
20	Younger people must show respect to seniors.					
21	I'll steal if I'm in trouble.*					
22	Who that loves his country is the one who does his job best.					
23	We should experiment with what we have learned.					
24	Assistance should be given to resolve disputes between friends.					
25	Where there is no justice, there is unrest (chaos).					
26	Everything around us should be ordered well.					
27	People should keep their thoughts to themselves.*					
28	We should question the natural phenomena around us.					
29	No one should stray from the righteousness.					
30	Decisions made in the classroom should cover the opinion of the majority in the class.					
31	Friendships require showing respect to each other.					
32	All people should live in peace.					
33	Homeland is valuable to us.					
34	We should try to return the valuables we find to their owners.					
35	We should practise what we have learned in daily life.					

Adverse items: 1,14,16,21,27

Note: English language validity study of this scale has not been conducted.

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Research Article

The reasons that prevent teachers' professional competencies from turning into performance

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Abstract

The purpose of this research is to examine the reasons that prevent teachers' professional competencies from turning into performance, according to teachers' views. The research was designed in the phenomenology pattern, which is one of the qualitative research designs. The study group of the research consists of 14 teachers working in public schools in Odunpazarı district of Eskişehir province. A semi-structured interview form was used as a data collection tool in the research. Research data were obtained from interviews with teachers. Content analysis technique, which is one of the qualitative data analysis techniques, was used in the analysis of the data. In the research, 7 sub-themes emerged under the theme of obstacles in the transformation of teachers' professional competence into performance. These sub-themes are working conditions, managerial attitudes, legal regulations, personal reasons, student-related reasons, parents-related reasons, and economic reasons. In the research, 7 sub-themes emerged from the opinions of the teachers under the theme of what needs to be done to turn professional competence into performance. These sub-themes are; improving working conditions, things to be done by school administrators, things to be done about lessons, applicable policies and legal regulations, things to be done for students, things to be done by parents, and improving personal and economic rights. When the findings obtained as a result of the research were evaluated, it was seen that multiple factors prevented teachers' professional competencies from turning into performance. In particular, the fact that non-teaching reasons are more than teacher-related reasons shows that non-teaching factors play an important role in teacher performance.

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Introduction

The importance of the education system in reaching the level of development and welfare of countries is better understood day by day. Because the success of the education system is directly proportional to the development. In this direction, countries aiming to increase their development levels make significant investments in their education systems. Today, important steps are taken by country administrations to increase the quality of education, such as increasing the shares allocated from the budgets and making investments in physical infrastructure. However, although many things have been done for education, it is seen that the desired success has not been achieved.

The success of the education system depends on the achievement of the goals of the school. Teachers have an important role in achieving the goals of the school (Boudersa, 2016). One of the factors that affect teachers' fulfillment of this role is their professional competencies (Schwarzer & Hallum 2008).

The concept of competence, first introduced by Bandura (1977), continues throughout life. It is the judgment of a teacher that he/she can achieve the desired results in his/her students (Yüksel, 2012). Professional competence is the

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ability of teachers to fulfill their professional duties and regulate their relations with their students during the education and training process, and the ability to fulfill institutional duties and be a part of the social and political processes of the institution (Friedman & Kass 2002). Based on social-cognitive theory, teacher professional competence is conceptualized as the personal beliefs of the teacher about the ability to perform, organize and plan activities necessary to achieve the given educational goals (Skaalvik & Skaalvik, 2010).

Teachers with a high belief in professional competence improve people's success and personal peace, experience less negative emotions such as anxiety, fear and depression while trying to reduce the problematic behaviors of students, set high goals for themselves and assume high responsibility to reach these goals (Schwarzer & Hallum 2008).

Organizations use performance-related issues as a strategic element in order to achieve their goals, motivate employees, increase productivity and increase the level of success (Çukurçayır and Eroğlu, 2005: 132). Therefore, it is important to determine what factors are directly or indirectly related to its performance.

The performance of employees significantly affects the success of organizations (Kale, 2015: 104). In educational organizations, the performance of teachers has a significant impact on the quality of the education system (Boudersa, 2016).

As a general concept, employee performance is the effective fulfillment of the employee's task and achieving a final result (Özpehlivan, 2015: 137). However, in increasing the employee performance of organizations; It would be appropriate to use techniques such as improving the physical conditions of the workplace and reorganizing the environment, restructuring the management systems, enriching the work environment and work, establishing a performance-based wage and incentive system, ensuring the participation of employees in the activities of the organization, disseminating the use of technology and redistribution of resources (Bozkurt Bostancı, 2004).

The ability of the school to fulfill its functions, in other words its mission, depends on the performance expected of the teachers who play a key role among the education employees. Professional competence and employee performance are interrelated concepts. It is stated that performance increases with competence (Scarbrough, 1998; Le Deist & Winterton, 2005: 29). However, it is known that teachers, who are at a good level in terms of professional competence, cannot reflect these competences in their performances.

In a more detailed definition made by Lucia and Lebsinger (1999), competence is defined as a group of knowledge, skills and characteristics that affect a significant part of the role and responsibilities of the person at work, are related to his/her job performance, can be measured with accepted standards, and can be improved through training and development.

Various studies examining the professional competencies and performances of teachers have taken their place in the literature. Hoy & Woolfolk (1993) draws attention to the fact that teachers' professional competencies are an important variable in creating an efficient school environment. Asthon and Webb (1986) found that teacher competence is an important factor in student success. Brouwers, Evers & Tomic (2001) concluded in their research that teachers with low professional efficacy beliefs leave their jobs in a shorter time. In the study conducted by Teel (2003), it was concluded that the support of the administrator and the organization is effective in teacher performance. Bowling (2007) stated that there is a negligible relationship between an individual's job satisfaction and performance. Bağcı & Mohan Bursalı (2015) concluded in their research that an environment in which all kinds of efforts of the employee are observed and appreciated contributes to employee performance.

Problem of Research

When both the professional competence of teachers and the studies on teacher performance are evaluated, it can be said that investigating the obstacles to the transformation of teachers' professional competencies into performance will contribute to the quality of education. There may be many obstacles in front of teachers' professional competencies turning into performance. Determining what these obstacles are and offering solutions can facilitate the transformation of professional competencies into performance or increase teacher performance. This, in turn, can increase the effectiveness of teachers and positively affect student learning. It is expected that this research will contribute to the improvement of teacher performance by identifying the obstacles to the transformation of teachers'

professional competencies into performance. In this direction, the aim of the research is to examine the reasons that prevent teachers' professional competencies from turning into performance, according to teachers' views. In order to achieve this aim, answers to the following questions will be sought:

- According to teachers' opinions, what are the barriers in transforming teachers' professional competencies into performance?
- According to teachers' opinions, what should be done to reflect professional competency on performance?

Method

Research Model

This research, which aims to reveal the reasons that prevent teachers' professional competencies from turning into performance according to teachers' opinions, was carried out with a qualitative research method. The research was carried out according to the phenomenology pattern of the qualitative research method. In the phenomenology design, it is aimed to reveal the experiences and the meanings attributed to these experiences by determining the in-depth experiences and thoughts of the participants about a subject (Smith & Fowler, 2009). In this context, the phenomenon of the study is the obstacles in the transformation of teachers' professional competencies into performance. Considering that the participants of the study had experiences and observations about the phenomenon of the study, the study was carried out according to the phenomenology pattern.

Participants

Since the phenomenological research design was used in this study, attention was paid to select the research participants among those who could explain the experience of the phenomenon in order to analyze the data in detail (Yıldırım & Şimşek, 2016). The research was carried out with 14 teachers working in public schools in Eskişehir. While determining the participants, the maximum diversity sampling technique, which is a purposive sampling method, was used. Maximum diversity sampling; It is defined as the determination of similar and different situations in relation to the problem examined in the universe and conducting the study on these situations (Büyüköztürk, 2014). In the use of this technique, it is aimed to reach richer and more detailed data by providing the diversity of the participants. Personal variables such as seniority, gender and age were taken into account while determining the teacher in the study. In addition, care was taken to ensure that the schools where the teachers work are at different levels (primary school, secondary school, high school), in different neighborhoods and in different socio-economic environments (lower-middle-upper). In this way, it is aimed to achieve diversity in terms of schools and therefore the problems experienced. Information about the study group is shown in Table 1:

Table 1. Demographic information of the participants

Code	Gender	Type of school work	Branch	Seniority
T 1	Female	Secondary School	Science and Technology	22
T 2	Male	High School	History	14
T 3	Female	Secondary School	Science and Technology	17
T 4	Male	Primary School	English	12
T 5	Female	Secondary School	Elementary Mathematics	21
T 6	Female	Primary School	Classroom Teacher	26
T 7	Female	High School	Biology	17
T 8	Male	Primary School	English	12
T 9	Female	Secondary School	Elementary Mathematics	21
T 10	Female	Primary School	Classroom Teacher	26
T 11	Male	High School	Music	18
T 12	Female	Secondary School	Turkish	20
T 13	Male	High School	Philosophy	14
T 14	Female	Primary School	Classroom Teacher	15

Data Collection Tools

In the research, a semi-structured interview form was used to identify the reasons that prevent teachers' professional competencies from turning into performance. The data collection tool was developed in four stages. In the first stage, the relevant literature was scanned, previous studies were examined, and open-ended questions were prepared in the light of the information obtained. In order to ensure the internal validity of the questions prepared at the next stage, the opinions of two academicians who are experts in educational sciences were taken. In line with expert opinions, some changes and arrangements were made on the questions. In the third stage, the comprehensibility of the questions was checked by taking the opinions of the expert in the field of Turkish teaching. In the last stage, a preliminary application was made to three teachers from outside the research group. In the pre-application, it was determined that the questions were understood by the participants. The interview form consists of two parts, and the first part is the demographic characteristics of the teachers participating in the research; The second part consists of 2 questions asked to identify the obstacles in the transformation of teachers' professional competencies into performance. The data in the study were obtained through face-to-face interviews with teachers. The interviews were carried out by the researcher between 03 December 2021-19 February 2022. The interviews were held in their own schools at the designated times in order to enable them to express their feelings in a clear and comfortable way, in line with the appointments received from the teachers.

Data Analysis, Validity and Reliability

Content analysis technique, which is one of the qualitative data analysis techniques, was used to analyze the opinions of teachers regarding the reasons that prevent teachers' professional competencies from turning into performance. The purpose of content analysis is to reach relationships and concepts that can explain the collected data. Unnoticeable concepts and themes are discovered and brought together as a result of content analysis, and presented in an organized manner in a way that the reader can understand (Yıldırım & Şimşek, 2016). Audio recordings were transcribed before starting the analysis. In order to check the accuracy of the transcription process, the data obtained from the voice recordings and the data obtained from the interview form were compared. 65 pages of data were obtained from the interviews. In the process of analyzing the data obtained, first of all, the interview records were deciphered and analyzed. Various codes were created by considering the common points in the answers given for each question. The reliability of the research was determined by comparing the placements made by the independent educational scientist and the placements made by the researcher. As a result of the comparison, it was understood that there was a consensus of 89%. This ratio was calculated using the reliability formula of Miles and Huberman (1994) (Reliability Formula: Consensus/Consensus + Disagreement). In addition, direct quotations have been included to reflect original views and thoughts. These can be considered as applications that will increase the validity and reliability of research data. In order to ensure confidentiality, the participants were identified with the abbreviation Teacher 1 (T1), Teacher 2 (T2), .. Teacher 14 (T14) and each participant was given a number.

In order to ensure internal validity, participant confirmation was used in the study. Accordingly, after the interview with each participant was recorded on paper, it was shared with the relevant participant and the participant was asked to review their views and to fill in the deficiencies, if any. The same procedure was repeated for each interviewer. Some participants were sent the interview text via e-mail, while others were delivered by hand. A detailed description strategy was used to ensure the transferability of the research. Accordingly, each stage of the research was presented to the reader in all details and all processes were mentioned as clearly as possible. In order to ensure the consistency of the research, the consensus strategy between the coders was used.

Cresswell (2007) points out that coherence between coders is one of the important processes that ensure reliability in qualitative research. In this context, the raw data of the research were shared with a faculty member who is not in the research group, who is an expert in qualitative research and has studies on postgraduate education, and he was asked to produce themes and codes based on these raw data. Then, these themes, categories and codes were compared with the final themes and codes that the researchers came to a decision on with a common attitude. In the comparison, a high

level of agreement was found between the theme and the codes. In the research, a model was created in order to visualize the themes created as a result of participant opinions. The created model is presented in Figure 1.

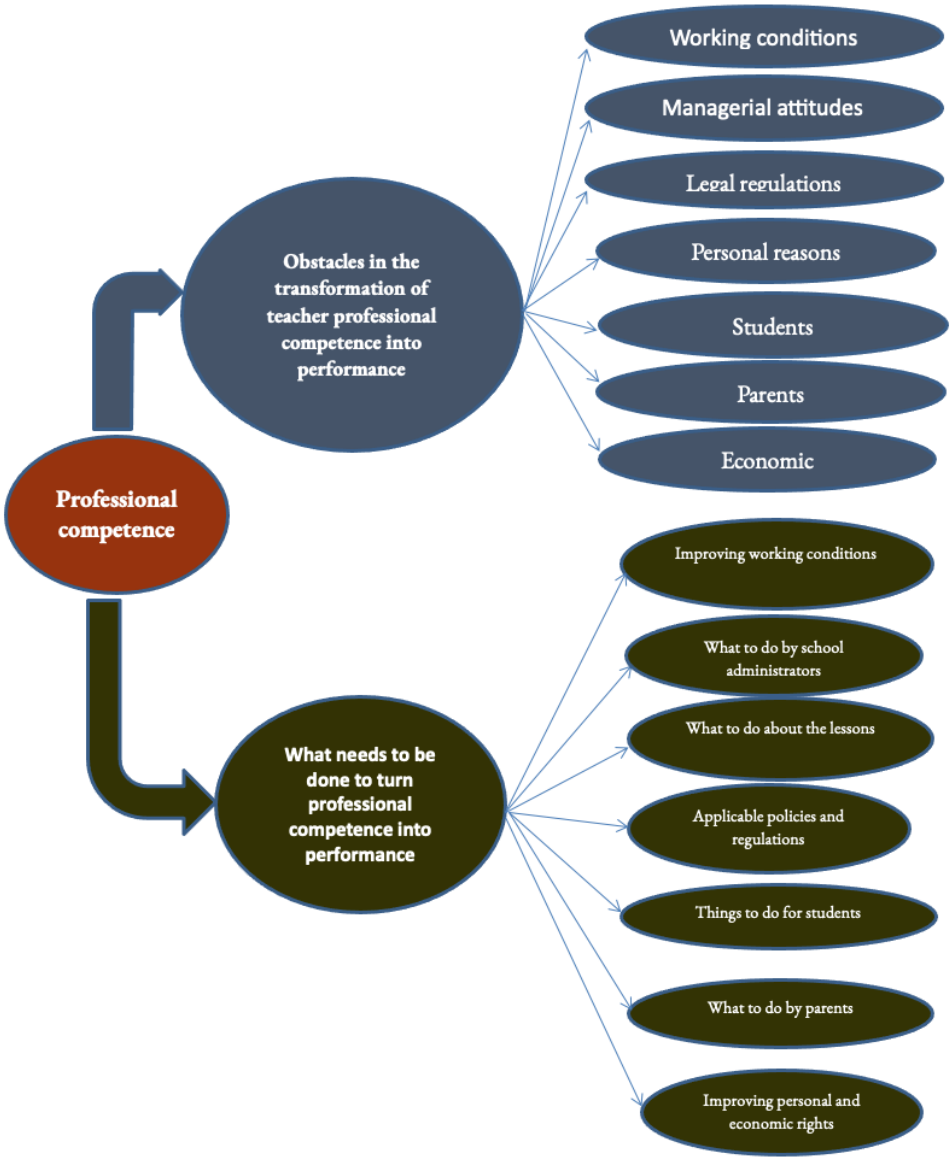

Figure 1. Opinions of participant teachers model created as a result of the analysis

Findings

In this section, teachers' views on the reasons that prevent teachers' professional competencies from turning into performance and what needs to be done to turn teachers' professional competencies into performance are given.

The Reasons That Prevent Teachers' Professional Competencies From Turning Into Performance

Teachers' views on the obstacles in transforming teachers' professional competence into performance are presented in Table 2.

Table 2. Findings on the obstacles for teachers to transform their professional competencies into performance

Theme	Sub-theme	Codes
Obstacles to professional competence	Working conditions	high course load, crowded classrooms, negative school climate, inadequacy of physical infrastructure, location and environment of the school, inadequacy of colleague cooperation
	Managerial attitudes	autocratic management, distrust, lack of effort, communication style, not supporting the teacher, not acting fairly
	Legal regulations	Law no. 657, prohibition of using auxiliary resources, lack of performance system, not encouraging performance
	Personal reasons	professional burnout, low motivation, boredom, fatigue, stress
	Student-related reasons	readiness level, student level, generation gap, motivation, compulsory education, negative perception towards the course
	Parents-related reasons	unconsciousness, non-cooperation, low level of education, negative attitudes, insecurity, involvement in the teacher's work.
	Economic reasons	low wages, insufficient additional tuition, lack of economic incentives

In the research, 7 sub-themes emerged under the theme of obstacles in the transformation of teachers' professional competence into performance. These sub-themes are working conditions, managerial attitudes, legal regulations, personal reasons, student-related reasons, parents-related reasons, and economic reasons. Under the sub-theme of working conditions, high course load, crowded classrooms, negative school climate, inadequacy of physical infrastructure, location and environment of the school, and insufficient cooperation with colleagues were expressed as obstacles to the transformation of teachers' professional competence into performance. Under the sub-theme of managerial attitudes, autocratic management, insecurity, lack of effort, communication style, not supporting the teacher and not acting fairly were expressed as the obstacles in transforming the professional competence of teachers into performance. Under the sub-theme of legal regulations, Civil Servants Law No. 657, the prohibition of using auxiliary resources, the absence of a performance system and the failure to encourage performance are expressed as obstacles in the transformation of teachers' professional competence into performance. Under the sub-theme of personal reasons, professional burnout, low motivation, boredom, fatigue and stress were expressed as obstacles in transforming teachers' professional competence into performance. Under the sub-theme of reasons related to the student, indifference, readiness level, student level, generation gap, motivation, compulsory education and negative perception towards the course were expressed as obstacles in the transformation of teachers' professional competence into performance. Under the sub-theme of reasons related to parents, indifference, unconsciousness, non-cooperation, low level of education, negative attitudes, insecurity and interference with the teacher's work are expressed as obstacles to the transformation of teachers' professional competence into performance. Under the sub-theme of economic reasons, low salaries, insufficient additional lessons and lack of economic incentives were expressed as obstacles to the transformation of teachers' professional competence into performance. Some of the teachers' views on these sub-themes are as follows:

> *I have to attend classes for about 30 hours a week. Taking so many classes causes me to experience fatigue and stress. As a result, I can say that my performance has decreased. I can say that I can be more productive if my lessons are reduced (T3).*

> *Since I work in the city center, the number of students in the classes I attend is very high. I have a hard time maintaining control in the classroom. Almost all of the course is spent on maintaining discipline. I cannot fully demonstrate my professional skills (T6).*

I try to do my best while doing my teaching job. Most of the time I go home very tired. This does not upset me. However, not seeing our work and not being thanked by our school principal reduces both my motivation and performance (T8).

The poor communication of school administrators with teachers reduces the performance of teachers. Management cannot increase performance by putting pressure on teachers. Instead, school administrators should help teachers (T13).

What Should Be Done to Transform Teachers' Professional Competence into Performance

Teachers' views on what needs to be done to turn teachers' professional competence into performance are presented in Table 3.

Table 3. Findings on what needs to be done for teachers to transform their professional competencies into performance

Theme	Sub-theme	Codes
What needs to be done to turn professional competence into performance	Working conditions	reducing class sizes, establishing a positive school climate, reducing extracurricular tasks, increasing colleague cooperation, teamwork, improving physical infrastructure
	School administrators	empowering the teacher, motivating, acting fairly, effective supervision, being understanding, participating in decisions, supporting, helping, cooperation, taking initiative
	Lessons	reduce the course load, to increase the weekly course hours, to update the curriculum.
	Policy and legal regulations	establishment of a performance system, objective rewarding, rotation, improvement of professional law
	Students	regulation of the class passing system, prevention of negative behaviors, effective discipline practices, ensuring that they take responsibility
	Parents	trusting the teacher, showing respect, cooperation, fulfilling responsibilities
	Personal and economic rights	Ensuring career development, paying according to performance, giving service points

In the research, 7 sub-themes emerged from the opinions of the teachers under the theme of what needs to be done to turn professional competence into performance. These sub-themes are; working conditions, school administrators, lessons, policy and legal regulations, students, parents and personal and economic rights. Teachers stated that improving working conditions, reducing the number of subclasses, establishing a positive school climate, reducing extracurricular duties, increasing colleague cooperation, working in teams, and improving the physical infrastructure. In the sub-theme of things to be done by school administrators, teachers expressed empowering, motivating, acting fairly, effective supervision, being understanding, participating in decisions, supporting, helping, cooperation and taking initiative. In the sub-theme of what needs to be done about the lessons, it was stated by the teachers to reduce the course load, increase the weekly course hours and update the curriculum. In the sub-theme of applicable policies and legal regulations, the establishment of a performance system, objective rewarding, rotation, and improvement of professional law were expressed by the teachers. In the sub-theme of what should be done for students, it was stated by the teachers that the regulation of the grade passing system, prevention of negative behaviors, effective discipline practices, and ensuring that they take responsibility. In the sub-theme of what should be done by parents, teachers expressed trust, respect, cooperation and fulfilling their responsibilities. In the sub-theme of improving personal and economic rights, the teachers stated that ensuring career development, paying according to performance, giving service points. Some of the teachers' views on these sub-themes are as follows:

In order for teachers to do their job in the best way, school principals need to support teachers. Parents should cooperate with teachers and fulfill their responsibilities. In addition, student discipline regulations should be made again (T5).

Laws should be made to reward teachers who do their job well. Because most of the time, the teacher who works hard and the teacher who does not work are evaluated the same. If a teacher who works hard is not rewarded for his work, his performance will decrease after a while (T2).

No matter how good your professional competence is, if the working environment in your school is not good, this will affect you negatively. First of all, the school climate needs to be improved and teachers need to cooperate (T8).

If the materials that a teacher will use in his class are missing, the teacher will not be able to teach the lesson effectively. First of all, the course materials must be completed. Then, the number of lessons taught by the teacher should be reduced (T2).

A class must have less than 25 students. The readiness of the students should be good. The class passing system should be rearranged (T11).

Discussion and Conclusion

In this study, the reasons that prevent teachers' professional competence from turning into performance and what needs to be done to transform teachers' professional competence into performance were examined. In the research, firstly, the reasons that prevent the professional competencies of teachers from turning into performance were determined according to the opinions of the teachers. In this context, it has been understood that working conditions, managerial attitudes, legal regulations, personal reasons, student-related reasons, parents-related reasons and economic reasons prevent teachers' professional competencies from turning into performance. According to these findings, it was seen that there are multiple factors that prevent teachers' professional competencies from turning into performance. In addition, the many reasons other than teachers show that non-teacher factors play an important role in teacher performance. According to Knobloch & Whittington (2002), the most effective factors affecting professional competence are the support and encouragement of the teacher from the administrators, family, students and social environment, and the teacher's professional and pedagogical knowledge and education.

In the research, under the sub-theme of working conditions, high course load, crowded classrooms, negative school climate, inadequacy of physical infrastructure, location and environment of the school, and insufficient cooperation with colleagues were expressed as obstacles to the transformation of teachers' professional competence into performance. Bozkurt Bostancı (2004) works in increasing the performance of the employees of the organizations; It states that the physical conditions of the workplace should be improved and the working environment should be reorganized.

In the research, under the sub-theme of managerial attitudes, autocratic management, distrust, lack of effort, communication style, not supporting the teacher and not acting fairly were expressed as the obstacles in the transformation of teachers' professional competence into performance. According to Barutçugil (2002), one of the most important factors affecting employee performance is the manager. In the study conducted by Teel (2003), it was concluded that the support of the administrator and the organization is effective in teacher performance. Niederriter (2003) also found in his research that school administrators are effective in low or high performance of teachers, administrators are the first responsible for teacher development, school administrators can provide professional development of teachers, and insufficient administrative support is not provided to low-performing teachers. The result in Younghusband's (2006) study that the support received from the administrators is an important determinant in demonstrating the professional competencies of teachers supports the research findings.

In the study, under the sub-theme of personal reasons, professional burnout, low motivation, boredom, fatigue and stress were expressed as obstacles in transforming teachers' professional competence into performance. In the study

conducted by Betoret (2009), it was determined that stress and burnout were effective on teachers' professional competencies. Sarıçam and Sakız (2014) also showed that there is a significant relationship between teachers' professional competencies and professional burnout in their study with teachers. They determined that the high level of burnout negatively affected the professional competence of teachers. Friedman (2003) investigated the relationship between perceived professional competence and professional burnout among Israeli teachers. At the end of the study, it was determined that there is an inverse relationship between perceived professional competence and professional burnout.

Under the sub-theme of reasons related to parents, indifference, unconsciousness, non-cooperation, low level of education, negative attitudes, insecurity and interference with the teacher's work are expressed as obstacles to the transformation of teachers' professional competence into performance. Sevinç (2003) states in his study that a healthy parent-teacher relationship affects teachers' performance in teaching processes positively. Şişman and Turan (2004) state that parents' developing positive relationships with teachers will strengthen the teacher in their learning process and cause the teacher to gain an ally. Ergen and İnce (2017) argue that teachers need support from administrators, colleagues, and parents regarding their school work, and if they cannot receive this support, they experience negative feelings and cynicism.

In the context of the second category of the research, what needs to be done to transform professional competence into performance has been examined. Accordingly, the teachers participating in the research expressed their views on improving working conditions, what should be done by school administrators, what should be done about lessons, applicable policies, legal regulations, what should be done for students, what should be done by parents, and improvement of personal and economic rights. As with all employees, various individual and organizational factors are effective in the performance of teachers. The performance of teachers reflects positively or negatively on the performance of students and therefore on the quality of education (Hatipoğlu & Kavas, 2016). The ability of teachers to perform at the highest level is to provide feedback on their performance in the schools where they work, to identify their educational needs and potential, to provide support, to guide them, etc. It is possible with the existence of applications (Bozkurt Bostancı & Kayaalp, 2011).

As a result, in this study, which aims to examine the reasons that prevent teachers' professional competencies from turning into performance, it has been seen that multiple factors prevent teachers' professional competencies from turning into performance. In particular, the fact that non-teaching reasons are more than teacher-related reasons shows that non-teaching factors play an important role in teacher performance. It can be said that working conditions, managerial attitudes, legal regulations, personal reasons, student-related reasons, parents-related reasons and economic reasons prevent teachers' professional competencies from turning into performance. These results obtained in the research can be an important data source in improving teacher performance.

Recommendations

In line with the findings obtained in this study, the following recommendations can be made for practitioners and researchers.

Action plans can be prepared to eliminate obstacles so that teachers can demonstrate their professional competencies at a high level. Material and technology support should be provided to teachers, and cooperation should be made with institutions and organizations whose infrastructure and conditions are appropriate. A performance-enhancing incentive system such as an academic incentive can be created The teaching profession law can be revised to meet the needs and expectations with the participation and support of all segments. Awareness and awareness trainings can be organized for school administrators to increase the professional competencies of teachers. The number of students and the course load can be reduced.

Limitations of Study

This research was carried out with a limited number of teachers working in Eskişehir. The findings are limited to the opinions of the participating teachers.

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