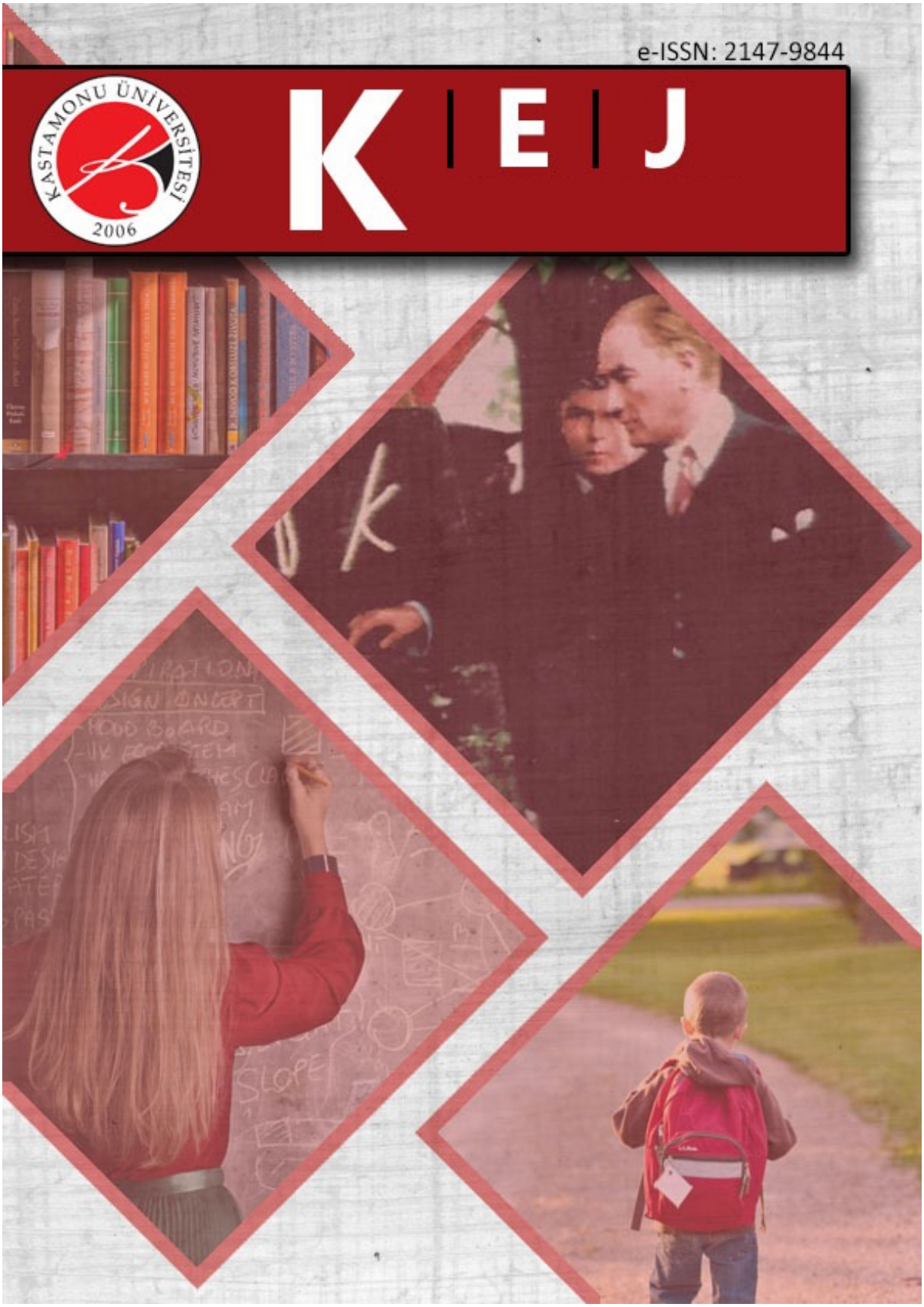


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| Research Article / Araştırma Makalesi |

# Do Father Support Programmes Make A Difference? Examination of the Father Involvement Roles

## Baba Destek Programları Fark Yaratır mı? Baba Katılım Rollerinin İncelenmesi[1]

**Aslı Sönmez[2], Tuğba Konaklı[3]**

**Keywords**
1. Father involvement
2. Preschool education
3. Parental involvement
4. Father support
5. Early childhood

**Anahtar Kelimeler**
1. Baba katılımı
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5. Erken çocukluk

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**Abstract**

*Purpose:* The purpose of this study is to examine why fathers who participated in the father support programme organised by Mother Child Education Foundation (MCEF) participated in the programme, the change in their views regarding father involvement roles, and their suggestions for the programme.

Design/Methodology/Approach: The research is in the qualitative research model and designed in case study method. The criterion sampling method was used to determine the study group of the research. The sampling of this study consisted of 12 fathers who regularly attended the Father Support Programme conducted in a kindergarten in Derince district of Kocaeli province in the 2019-2020 academic year. In the study the data obtained through a semi-structured interview form were analysed through the content analysis method.

*Findings:* According to research findings, participants took part in the programme to establish a close relationship, gain proper parental attitudes, and receive emotional support. The participant father views regarding father involvement and the change in their practices were examined in five categories: Interactive togetherness, accessibility, responsibility, empathic approach, and democratic attitude. In line with the study outcomes. The suggestions of the participants were demonstrated at the micro and macro levels. At the micro-level, it was indicated that the parents should attend such support programmes together, and families with different parental attitudes should be reached. At the macro-level, the integration of this school-run organisation into the educational curriculum and its spread through non-governmental organisations and municipalities are included.

*Highlights: It* was recommended that the father support programmes should be disseminated in schools and supported by the local authorities. For the dissemination of the training activities, studies can be carried out in universities for the prospective teachers to allow them to meet the Father Support Programme and the Ministry of National Education can take steps to support the teachers that are competent in family involvement programmes to apply these activities in their classrooms and schools.

**Öz**

Çalışmanın amacı: Bu çalışmanın amacı, Anne Çocuk Eğitim Vakfı (MCEF) tarafından düzenlenen baba destek programına katılan babaların programa neden katıldıklarını, baba katılım rollerine ilişkin görüşlerinin değişimini ve programa yönelik önerilerini incelemektir.

Materyal ve Yöntem: Araştırma nitel araştırma modelinde olup durum çalışması yöntemiyle tasarlanmıştır. Araştırmanın çalışma grubunu belirlemek için ölçüt örnekleme yöntemi kullanılmıştır. Bu araştırmanın örneklemini 2019-2020 eğitim öğretim yılında Kocaeli ili Derince ilçesinde bir anaokulunda yürütülen Baba Destekleme Programına düzenli olarak katılan 12 baba oluşturmuştur. Araştırmada yarı yapılandırılmış görüşme formu aracılığıyla elde edilen veriler içerik analizi yöntemiyle çözümlenmiştir.

Bulgular: Araştırma bulgularına göre, katılımcılar yakın ilişki kurmak, uygun ebeveyn tutumları kazanmak ve duygusal destek almak için programa katılmışlardır. Katılımcı babaların baba katılımına ve uygulamalarındaki değişime ilişkin görüşleri, etkileşimli birliktelik, erişilebilirlik, sorumluluk, empatik yaklaşım ve demokratik tutum olmak üzere beş kategoride incelenmiştir. Çalışma sonuçları doğrultusunda katılımcıların önerileri, mikro ve makro düzeyde ortaya konmuştur. Mikro düzeyde, anne babaların bu tür destek programlarına birlikte katılmaları ve farklı anne baba tutumlarına sahip ailelere ulaşılması gerektiği belirtilmiştir. Makro düzeyde ise okul tarafından gerçekleştirilen bu programın eğitim müfredatına entegrasyonu ve sivil toplum kuruluşları ve belediyeler aracılığıyla yaygınlaştırılması önerilmiştir.

Önemli Vurgular: Okullarda baba destek programlarının yaygınlaştırılması ve yerel yönetimler tarafından desteklenmesi baba katılım rollerinin önemini ortaya koyabilir. Eğitim faaliyetlerinin yaygınlaştırılması için üniversitelerde öğretmen adaylarının Baba Destek Programı ile tanışmalarına yönelik çalışmalar yapılabilir ve Milli Eğitim Bakanlığı aile katılım programları konusunda yetkin olan öğretmenlerin başvuru yapmasına destek olacak adımlar atabilir.

[1] This article is derived from Aslı Sönmez's Master's thesis conducted under the supervision of Assoc. Prof. Dr. Tuğba Konaklı at Kocaeli University Institute of Social Sciences, Department of Educational Administration.

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## INTRODUCTION

The school-family relationship starts in the preschool period, and this relationship has the potential to shape the school perceptions of the children and families in time. Families represent the first essential source for their learning and development as a lifelong resource to children (Jeynes, 2014; Downer & Myers, 2010). Studies show that family involvement contributes to student achievement significantly (Epstein, 2010; Christenson & Reschly, 2010; Larocque, Kleiman & Darling, 2011; Taylor, Clayton & Rowley, 2004; Wilder, 2014). The new conception of the role of the family in child education has recently transformed into a school-family-community partnership model that is more comprehensive than limited family involvement (Epstein, 2010). Family involvement refers to participating in the educational activities of children to support their academic and social well-being (Fishel & Ramirez, 2005). While Epstein (2005) explains family involvement as a kind of school and classroom organisation where educators and families share responsibilities to ensure the learning and success of children, McClelland and Morrison (2003) specify it as the involvement of families in the educational process to support the education and development of their children positively. Thus, family involvement which includes practices such as helping children with their homework, communicating with teachers, and catering to school, contribute to the positive development of many skills in the early childhood period. Therefore, family involvement emphasises a key component of early childhood education (Rimm-Kaufman & Pianta, 2005; Taylor et al., 2004). The goal of family involvement practices in the preschool period is to enable both mothers and fathers to support their children by getting involved in school activities. However, in the research conducted, teachers indicate that their interlocutors when sharing information about child development are mainly mothers. It is a fact that in the preschool period, fathers get less involved in the educational activities of their children comparing to mothers. And likewise, the number of studies that examine the father-child relationship in this period is limited. The importance and necessity of attracting fathers to school through school-family activities are shown among the results of the family involvement practices (Baldwin et al., 2019; Dingus et al., 2022; Maselko et al., 2019). Hence, studies also show that there are also many traditional gender views, separating mother and father roles (Sudkämper et al., 2019; Summer et al.,2004). During the transmission of traditional values, gender stereotypes are also transmitted. For this reason, parenting roles and childcare are seen as the sole responsibility of the mother. Primarily, fathers are the breadwinners and secondarily parents (Andreasson & Johansson, 2016; Baruch & Barnett, 1987; Sudkämper et al., 2019). However, father roles in the lives of children are just as crucial as mother roles. Studies show that the father-child relationship is different from the mother-child relationship, and this unique relationship is vital for successful child development (Caldera & Hart, 2004).

The children who did not get enough parenting from their fathers most likely have negative behaviours such as timidity and shyness. Children who spend more time with their fathers are more advantageous in terms of social, emotional, cognitive, and physical development (Maselko et al., 2019; Rolle et al., 2019; Wilson &Prior, 2011;). Not only father involvement contributes to the development of the child, but also it contributes to the father himself and the relationship between the spouses positively. As fathers spend quality time with their children interactively, they get more satisfied with the fatherhood roles and enable family members to establish more positive relationships with each other (Kotelchuck, 2022; Kwok & Li, 2015). For example, they will share the mother workload when they take care of their children, and this situation will affect the quality of the relationships within the family (Lamb, 1997). At this point, the emotional support which fathers provide is also crucial for mothers. Fathers increase the quality of the mother-child relationship when they support the mothers of their children. When they do not help out, children will also be adversely affected as mothers (Cummings & O'Reilly, 1997). Studies reveal that fathers do not take enough responsibility for the family involvement in the preschool period whereas, the spouses support each other by sharing the roles in today's modern family. The interaction of fathers and mothers with their children is fundamentally similar, and this situation points to the fact that father involvement is as effective as mother involvement (Marsiglio,1995). However, when the studies were examined, it was observed that even if the fathers take the responsibility of getting involved in the preschool period more, mothers still get involved in the educational activities more than fathers (Unuvar, 2011; Darling- Fisher & Tiedje, 1990).

Children need the support of affectionate and sensitive adults from infancy to adolescence. Boller et al., (2006) consider that father involvement in the preschool period can affect the children development directly. Fathers can get involved in school or home environment by taking part in the relevant school activities and assisting their children with their homework (Williams, 2010). Research demonstrates when fathers get involved in the education of their children actively through the activities such as; developing higher empathy, self-esteem, verbal and problem-solving skills, this brings favourable outcomes in children (Fathers & Network, 2011). For example, a study revealed that 90% of children with father involvement achieved academic and social success (Kramer, 2001). Likewise, according to Tekin (2012), the children whose fathers are involved in early childhood education start kindergartens with higher school readiness skills than the children with a lower level of father involvement. Father support plays a favourable role in the definition and development of analytical skills, intelligence levels, core skills, linguistic intelligence, and academic achievement of children (Williams, 2010; Pagan & Fagan, 2008), social and emotional skills, maturity, level of independence, psychosocial adaptation, and gender identity (Wilson & Prior, 2011; Tezel Şahin & Özyürek 2010; Caldera & Hart, 2004; Coley & Morris, 2002).

Despite the studies in the literature, family involvement activities in schools are still mother-oriented. Early childhood educators state that father involvement is less (Aydın, 2003; Unuvar, 2011). For this reason, it becomes clear that father involvement roles must be supported in schools with educator reinforcement, and fathers must be encouraged to take part in the

family involvement activities. Hence, evidence obtained from various cultures put forward that the way fathers communicate is unique and different (Bronte-Tinkew et al., 2008; Kramer, 2001; Rolle et al., 2019). When we summarise the studies in general, we see that the importance of fathers in child development has been revealed despite the limited studies about fathers with children in the preschool period. However, although the significance of father involvement for child development is known, it is still considered that the primary responsibility for developing children is on mothers, and there is not a rooted perception regarding the conception that the father involvement is as compulsory as mother involvement (Wilson & Prior, 2011). Studies recommended developing intervention activities related to father involvement to strengthen this perception (Uludağlı, 2017). Likewise, Koçak (2004) indicated that although fathers take more active responsibility for their children together with the fatherhood role influenced by the changing social structure, fathers need support for involvement, there are shortcomings about the activities for them in family involvement in the preschool period, and training is necessary for them. Many research activities conducted in Turkey and across the world pointed out that fathers are as essential as mothers in the education of their children and pointed to the importance and necessity of attracting fathers to the school (Downer & Mendez, 2005; Çağdaş & Seçer, 2010). MCEF organised an FSP programme in an independent kindergarten in the Derince district in Kocaeli province. And this study aims to analyse the reasons for the trainee fathers to attend the programme, the change in their views on father involvement roles, and their suggestions for the programme. The question of the study is "What kind of a change occurred in the fatherhood roles of the participants of the father support programme (FSP) in line with their participation goals, and what are the recommendations?" In this scope, the answers to the following sub-questions were sought.

1. What are the reasons for fathers to attend the father support programme?
2. What kind of a change occurred in the views of the fathers on fatherhood roles after they attended the father support programme?
3. What are the suggestions of the fathers who completed the father support programme regarding the training programme?

## METHOD

### Research Model

In this study, the qualitative research method was applied because it aims to reveal why fathers needed to participate in the father support programme, fatherhood roles of these fathers after they participated in the training activities, and their views on how to improve this programme. According to Creswell (2002), qualitative research is a type of research based on questioning, exploring, and explaining the problem situations related to social life and people, with its own methods. In this study, the case study design, one of the qualitative research designs, was preferred since the answers to the questions beginning with words "why" and "how" were sought when receiving the views of the participants. In this study, it was tried to examine why the participants preferred to participate in this programme and what the effects of the programme were. It was tried to examine why the participants preferred to participate in this programme and how the effects of the programme were. The case study comes to the fort as a research method proceeding based on the questions beginning with words "why" and "how", providing the researchers to deeply examine the current phenomena and events which they cannot control (Yıldırım & Şimşek, 2011, Yin, 2014). Implementing this design through the realistic examples obtained from individuals' natural environments enables researchers to exhibit the phenomena with a holistic approach.

### Study Group

The study group was formed through the criterion sampling method as one of the purposeful sampling methods. Two criteria were used to determine the participants in the study. The first criterion was to include the fathers who attended the father support programme. The second criterion was to involve the fathers with children that still attended kindergarten. The sampling of this study consisted of 12 fathers who regularly attended the Father Support Programme conducted in a kindergarten in Derince district of Kocaeli province in the 2019-2020 academic year since this study focused on the involvement of the fathers with children between the ages of 3 and 6. Participant codes were given with the letter "P" for the word participant and in numbers (P1, P2, etc.) according to the order of the participation in the study. The features of the participants were given in Table 1.

### Data Collection

In the data collection process, preparing the research questions, preparing an interview form, specifying the study group, and conducting interviews were followed in order (King, 2004). In this study, primarily, semi-structured questions were prepared to be used during the interviews. The validity of the interview form was provided by receiving the opinions of two subject matter experts. The interview form was rearranged according to the expert opinions and then finalised. The interview form was piloted with two participants who had participated in the father support programme previously. After the implementation, based on the answers given, a conclusion was drawn that the questions were comprehensible. The interviews took place four weeks later than the programme to give time to the fathers to find an opportunity to apply what they learned during the programme. Interviews lasted between 20 minutes and 30 minutes.

**Data Analysis**

In the study, the content analysis method was used at the evaluation stage of the data obtained during the interviews. The content analysis is the conceptualisation of the data after the data collection stage primarily by coding and then by categorising them and a deep and regular examination of the messages in the text (Baltacı, 2019). The conceptual meaning of each piece of data was examined. Then the obtained codes were divided into categories (Corbin & Strauss, 2007). Trustworthiness is primarily emphasised to provide the validity and reliability of qualitative research. The sub-dimensions of trustworthiness are listed as credibility, dependability, confirmability, and transferability (Merriam, 2013). It is important to ensure the credibility for the internal validity in the outcomes of research. Long-term interaction, participant confirmation, and expert reviews methods are used to ensure credibility (Holloway & Wheeler, 1996). The expert opinions were asked related to the codes and categories created during the data analysis. In qualitative research, to ensure validity, it is essential to receive expert opinions about the created codes and categories and make calculations according to the agreements and disagreements (Miles & Huberman, 1994). The raw data obtained in the research, codes and categories were submitted to the examination of three faculty members who are experts in educational sciences and their opinions were calculated using Miles and Huberman's (1994) formula (Reliability = Agreement / Agreement + Disagreement) to ensure the reliability of the study. In the reliability work conducted for this study, a 90% agreement rate was achieved. The data were analysed by taking the voice records to ensure the objectivity of the study. The coding and category method were used for the findings. Besides, the participant views were presented with their own statements in the findings section. To ensure validity and reliability, creating data through original opinions and reporting in detail how the results are reached are essential criteria for the academic studies (Yıldırım & Şimşek, 2011).

**Table 1. Demographic Features of the Study Group**

| Code | Education Level | Age | Occupation | Number of Children |
|---|---|---|---|---|
| P1 | Secondary School | 35 | Worker | 1 |
| P2 | Elementary School | 38 | Worker | 2 |
| P3 | Bachelor's | 37 | Teacher | 2 |
| P4 | Secondary School | 40 | Tradesman | 2 |
| P5 | Secondary School | 42 | Tradesman | 2 |
| P6 | Secondary School | 36 | Worker | 1 |
| P7 | Bachelor's | 38 | Teacher | 1 |
| P8 | Bachelor's | 38 | Engineer | 1 |
| P9 | Bachelor's | 45 | Engineer | 2 |
| P10 | Secondary School | 43 | Tradesman | 2 |
| P11 | Secondary School | 37 | Worker | 1 |
| P12 | Secondary School | 35 | Worker | 1 |

## FINDINGS

The categories reached through the content analysis of the data obtained about why fathers wanted to participate in the Father Support Programme, the change in father involvement roles that the programme created and the participant suggestions for the programme, are shown in Figure 1.

**Reasons for Participating in the Father Support Programme**

The reasons for the participants who were included in the study to participate in the Father Support Programme were examined in three categories: "Close relationship with the child, proper parental attitudes, and emotional support". In the dimension of the close relationship with the child, as the reasons for participating in the father support programme, the needs of the fathers such as; understanding the development and behaviours of their children better, knowing their children, getting support to strengthen the relationship with them, come to the forefront. Contributing to strong communication skills with children and improving the experiences with spending efficient and quality time with them are among the reasons for fathers to participate in the programme. The participants wanted to pull out of classic methods and have fatherhood roles with a scientific and professional approach, so they attended the father support programme. The participants needed to act by trusting themselves in raising their children. The fact which emerges among the reasons for attending the programme is that the parenthood of their parents affected the participants. For example, a participant expressed this situation as follows;

*"I came to realise that something we learnt from our fathers and mothers, and we know that they are correct, are actually false. Whatever our parents say, we followed their behaviours and guidance. Naturally, they did not ask the opinions of children, that is, our opinions. I wanted to attend to see what I did right, what I did wrong." (P2).*

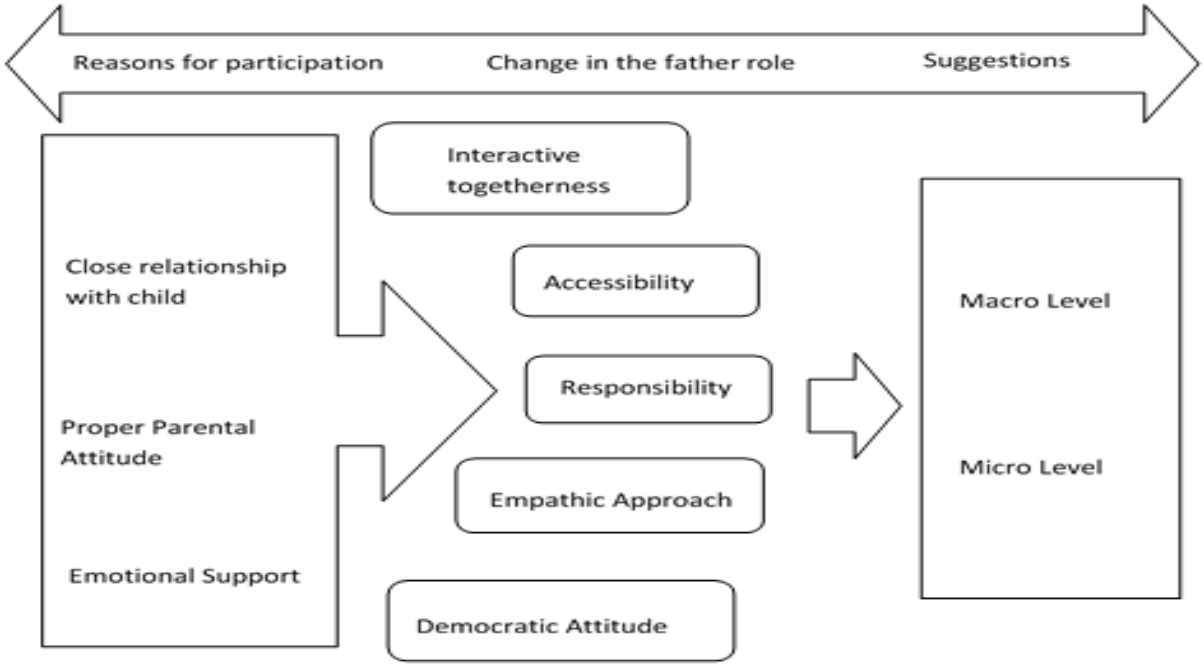


**Figure 1. Categories related to the reasons for participating in FSP, change in the father involvement roles, and suggestions**

Another reason for the participants' participation in the father support programme is related to their ability to control their emotions in their relationships with their children. The father encounters problems while coping with their children's behaviours with the factors such as workload and tiredness. And because they have difficulty dealing with this situation, they feel emotionally uneasy. They ignore that the children are individuals, assume an oppressive attitude towards them, and wave aside their wants. This situation paves the way for the domestic conflict environment. According to the data obtained, parents stated that they felt emotionally uneasy because of their attitudes towards their children and registered to the programme to solve domestic conflicts. For example, the expressions of P9 unfolds this circumstance;

*"I am a concessive father. I did nothing with my father. Frankly, because of this, I will do what my child asks. I have never hurt him/her so far. However, it has turned into a problem with my wife at home. In general, we had problems and conflict about this situation. I considered attending this programme to get support for this circumstance." (P9)*

**The Change in the Views on Father Involvement Role**

The fathers who attended the Father Support Programme stated their views on the fatherhood roles. And these roles were analysed in five categories: "Interactive Togetherness, Accessibility, Responsibility, Empathic Approach, and Democratic Attitude.

**Interactive Togetherness**

One of the categories that is efficient in the father involvement roles of the fathers who attended the programme is interactive togetherness. The programme enabled the fathers to realise the importance of spending time in good interaction with their children. The findings obtained from the interviews regarding the fatherhood roles conducted with the fathers revealed that the code: spending interactive and quality time with children comes into prominence. What is emphasised here is that being in the same environment with children does not mean spending time with them. The fathers, who attended the programme, indicated that the time spent together could have a meaning for both sides that they understand the necessity of interaction to actualise this and that they had already begun practises. Thanks to the programme, the fathers have changed their perspectives and started to consider that spending time with their children can become by interacting with them. The fathers reinforced ways to spend efficient time with their children through the assignments given in the course. For example, P6 stated this situation as follows. *"Previously, caring about my child meant to hang together while I was playing games on my mobile phone my child was playing on the tablet. I learnt that this was not spending time with my child and playing together." (P6)*

As we can see from these statements, before the programme, the fathers thought that "being around with their children" meant spending time with them. The other codes that the fathers, who are aware of spending time with children interactively,

emphasise are consisted of doing activities at home, playing games, and doing a different kind of activities together. The programme supported the fathers about how to spend time with their children in the home environment. For example, P3 emphasised the interactive togetherness with the following statements.

*"I learnt to design new things by beating my brain with my child and interacting. We have a lot of toys at home. For example, we have Lego pieces. We reuse them instead of rebuying them. … These were our assignments, and we applied these with the whole family." (P3).*

**Accessibility**

In the category of accessibility, in general, the father's understanding and reinforcement of his presence in the life of his child and the child's need for the presence of his father are included. The fathers who became accessible indicated that they started to understand better what their children wanted, and they spent healthier time mutually by meeting the needs of their children. P8 made the following explanation about this;

*"When I went home and told my child that I was having a rest, my child was getting ill-tempered, and both of us were getting angry immediately. After I attended this programme, I saw when my child asks for something and even if I allocate 10 minutes and do what he/she wants delightfully, my child relaxes, calms down, and leaves me alone. Later, other hours pass calmer and they are left for me. (P8)*

**Responsibility**

We see that the fathers take the "*responsibility*" towards their children when we examine the codes: eating and drinking, dressing, changing clothes, nutrition, covering the child with a blanket, bedtime routine revealed after the interviews. The conducted interviews revealed that the fathers with daughters considered that having a different gender from their daughters was a restrictive factor. For example, P2 thought that his daughter should have done some specific works with her mother. However, after participating in the programme, he realised that spending time together and parenting had nothing to do with the gender of the child. The fathers of daughters gained awareness of supporting their children in various subjects such as sexuality education. P1 pointed out that like the other parents who attended the programme, they could contribute to their children reaching them about different issues with the following explanation;

"*I have a daughter. In this programme, I have also learnt how to treat my child from sexual aspects, how to tell her the realities of the world, that I should not keep something quiet, and how to treat her in terms of sexuality for the sake of her development." (P1)*

**Empathic Approach**

The "*empathic approach*" category refers to accepting the child as an individual and recognising and understanding the emotions of the child as an individual. In the interviews, P10 expressed the essence of empathy and their awareness as follows. *"I understand that I must listen to my child, how their brains work, and how we should approach them thanks to the programme. The biggest contribution of this programme was this for me. I learnt to think like them. My empathy skill has developed." (P10).* Children also want their elders to give them responsibilities and let them act independently on the road to becoming an individual. The children can want to create an identification with their relatives by taking them a model. We see that the participants exhibit empathic behaviours such as accepting their children as individuals, stooping their level, and making eye contact. The statements of P12 regarding the empathy approach that strengthens communication as follows;

"*While we were talking with our children and making a dialogue with them, we were talking appropriate for our age group and in our own way. I learnt and understood the importance of talking with them by stooping their level, attracting their attention, and making eye contact." (P12).*

**Democratic Attitude**

The codes that the participants expressed during the interviews: making a joint decision with children, discussing, thinking together, listening to each other, receiving family members' opinions exhibit that the parents tended to show a "democratic attitude" after they attended the programme. The participants understood the importance of thinking together with their children at the problem-solving stage. Besides, the programme provided both fathers to care about their children as individuals and everyone in the family to support the decision mechanisms in interaction. P4 drew attention to this issue as follows. *"I developed a behaviour of fulfilling our child's wishes by making a joint decision thanks to the programme. All family comes together and talks about it, I learnt to get the opinion of the child.." (P4)*

**Suggestions for FSP Programmes**

The categories that were revealed by coding according to the suggestions of the participants who attended the father support programme were demonstrated at the micro and macro levels. Among the codes that came to the forefront at the micro-level, it

was indicated that the parents should attend such support programmes together, and families with different parental attitudes should be reached. Among the suggestions made at the macro-level, the integration of this school-run organisation into the educational curriculum and its spread through non-governmental organisations and municipalities are included. Generally, the participants reflected their satisfaction with the programme. The most prominent suggestion for the programme is in the dimension of attenders and it was about ensuring that both mother and father attend the programme together. According to the findings obtained, the participants dwelled on the consequences of the lack of education and emphasised that this situation creates ramifications regarding raising children and father involvement. The participants mentioned that this support programme should be announced especially to the parents with traditional perspectives, and they emphasised that many more fathers should be reached. Besides, the participants underlined that there should also be an increase in the number of accessed fathers who know their children, value their children as an individual, and take the right approach towards them. In a constantly changing world, the importance of participating in the training activities has been revealed in order to raise children with sound steps Increasing the activities in schools for parents, especially for fathers, has also been brought to the agenda within the suggestions. P5 stated the following on this issue.

*"We fathers must be invited to the schools more. The programmes should increase in number. The activities with children can be done with the whole family. Father involvement in activities betters their relationships with their children." (P5)*

Except for the programme titles and the content, the other aspects of the programme that the participants availed themselves of came to light in the suggestions section. The fathers made new friends during the programme. They emphasised that they found an opportunity to frequently share their opinions and suggestions regarding the activities, trip routes, and the solutions to the problems in this new social circle since they all had children in the peer group. The dissemination of the programme through macro-level support which was among the suggestions of the participants for the programme came to the forefront. According to the participants, the spread of the programme in all schools needs efforts. For example, P3 made the following explanation on this issue.

*"It must be included in the curriculum. It must be integrated into the system. The biggest problem of this nation is the lack of education. There is a large section of society that does not read and do research. We cannot achieve a change just by conducting this programme in a few places. The attendance of the parents must be made compulsory in every school." (P3).*

The participants also suggested collaborating with the municipalities to expand the programme at the macro level. They even wanted to reach more masses through the fairs by taking steps to collaborate with the municipality. The participants who made suggestions regarding the father support programme emphasised that this kind of training should have become widespread with more enriched content, and the collaboration with civil society and municipalities for support would be beneficial.

## DISCUSSION

The study findings show that the participants couldn't show consistency in their behaviours toward their children and relationships with them before they attended the programme. Some participants declared that they had a nervous attitude and did not know how to treat when they came home from work feeling tired while some participants stated that they did everything that their children asked and this situation became a problem in their relationships with their children. The inconsistent approaches of the participants cause them to have trouble in in-family relationships. The findings obtained from the study show that the fathers who attended the programme have positive opinions about the parental roles. That is, the belief of a father in the parental role plays a reinforcing role in father involvement (Kwok & Li, 2015; Sudkämper et al., 2019). The need to prevent family conflicts and to get emotional support manifests that the participants care about their relationships with their wives as much as with their children. This finding regarding the reason for the participants to attend the programme supports the findings in the literature which point out that the quality of the relationship between the spouses influences the father involvement (Kwok & Li, 2015; Bradford & Hawkins, 2006; Pedro et al., 2012; İvrendi & Işıkoğlu, 2010). The change in the father involvement roles of the fathers who attended the father support programme was examined in five categories: Interactive Togetherness, Accessibility, Responsibility, Empathic Approach, and Democratic Attitude. In the literature, accessibility, availability, and responsibility are the three prominent components regarding father involvement (Lamb et al., 1987). The fathers mainly preferred the games that include physical activities before the programme and then they began giving a place for creative, artistic, and exploratory activities in their games with children thanks to the programme. Various studies in the literature show that the father training given within the scope of family involvement contributed to the fathers positively in terms of spending interactive time with their children (Dingus et al., 2022; Pherson & Robinson, 1990)

The fathers understood their influences on the existence of their children with the Father Support Programme. As a result of their study, Kocayörük & Sümer (2009) indicated that the father involvement training activities contributed to the father-child relationship positively and made a change in the behaviours towards children, and this shows the similarity in the research outcomes. When the literature was examined, it was seen that the gender of the child is effective in father involvement, and fathers are more interested in their boys and take more responsibility in their care (Barnett & Baruch, 1987; Lamb, 2000). It was noticed that some fathers who attended the programme considered the gender of the child a restrictive factor before the programme. With the Father Support Programme, these perceptions of the fathers have changed. The effects of patriarchal

structure on the responsibilities towards children, such as eating, drinking, sleeping, or dressing, came to light with the study. Together with these results, the research findings show that the father support programme can be effective in terms of contributing to gender equality by recognising gender roles and stereotypical parenting roles (Sudkämper et al., 2019). The fathers stated that they provided their children with the responsibility and attention they did not receive from their fathers. Seeing what they did was correct through the programme supported their self-confidence. In the conception of today's contemporary fatherhood, the fact that the fathers assume more responsibility for their children in their parenting roles takes place in the other studies in the literature (Baldwin et al., 2019; Kwok & Li, 2015). In the study, accepting the child as an individual and realising and understanding the emotions of the child as an individual was examined as an "empathic approach". And an increase in the empathy skills of the fathers became thanks to the programme. It came to light that the fathers who acquired behaviours such as making eye contact and stooping children's level started to understand their children better, and this affected their relationships favourably. With the father support programme, the fathers felt and understood the importance of the play by finding an opportunity to rediscover their childhood emotions. The other research findings also support the positive contributions of these programmes regarding both fathers' relationships with their children and their favourable feelings (Unuvar, 2011; Downer & Mendez, 2005; Lamb, 2000). We see that the fathers who attended the programme demonstrate a tendency towards a democratic attitude. The fathers with democratic attitudes demonstrate more father involvement in terms of interaction, accessibility, and responsibility (Gaertner et al., 2007). The positive relationship between the programme and the democratic father attitudes, interactive togetherness with children, accessibility and taking responsibility is the similarity of this study with the other studies in the literature. The suggestions of the participants that attended the father support programme were analysed in two dimensions: at the micro and macro levels. The prominent suggestions exhibit mothers and fathers should participate in such support programmes together, and the families with different parental attitudes should be reached. Many studies support similar outcomes (Koçak, 2004; Pleck, 2010) The suggestions at the macro level included that this organisation run by the school should be integrated into the curricula and spread in the schools, and it should be disseminated more through non-governmental organisations and the municipalities.

## CONCLUSION AND RECOMMENDATIONS

Based on the study outcomes, it can be recommended to support the collaborations with preschool education institutions to spread the father support programmes to the wider masses. The local authorities can make a significant contribution to identifying the schools and parent profiles in the regions where training needs are appearent to specify the parent needs. For this reason, the support of the local authorities and non-governmental organisations to such programmes can facilitate the dissemination. For the dissemination of the training activities, studies can be carried out in universities for the prospective teachers to allow them to meet the Father Support Programme and the Ministry of National Education can take steps to support the teachers that are competent in family involvement programmes to apply these activities in their classrooms and schools. The father support programmes can be enriched with the activities that ensure mother and father involvement based on parental requirements in the regions where the schools are located. In this context, another issue to be considered is to determine the training needs of the parents. In this study, it was seen that the fathers needed a close relationship with their children, emotional support, and parental attitudes based on scientific foundations. However, parents from different school regions can have different needs. For this reason, while developing the contents of the father support programmes, pre-tests can be applied by considering the parent profiles and needs in the school area. The researchers can focus on the long-term effects of the long-term programmes to determine the impacts of the Father Support Programmes and ensure their continuity. The outcomes of this study focused on the father roles. However, other studies can examine the impacts of the programme on the family besides its effects on the fathers since the relationship between the domestic conflicts and father involvement is emphasised.

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### Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

### Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

### Ethics Committee Approval Information

The permission of the Ethics Committee of the research was obtained from Kocaeli University Social and Human Sciences Ethics Committee's date 22/04/2021 and numbered 2021/06, (Number: E-10017888-044-50796).

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| Research Article / Araştırma Makalesi |

# The EFL Teachers' Self-perceptions of Professional Teacher Identity in Turkey

## Türkiye'deki Yabancı Dil olarak İngilizce Öğretmenlerinin Mesleki Öğretmen Kimliğine Yönelik Öz-Algıları[1]

**Fatma KİMSESİZ**[1]

**Keywords**

1. EFL
2. Emoji
3. Metaphor
4. Professional identity
5. Teacher identity

**Anahtar Kelimeler**

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**Abstract**

*Purpose*: This study aims to investigate the professional identity of EFL teachers through metaphor and emoji elicitations.

*Methodology*: 40 teachers teaching EFL at different education institutions throughout Turkey voluntarily participated in the study. As the core point of the investigation, teachers were asked to frame their professional identity with representative metaphors besides explaining the main reason for selecting the related metaphor to represent their teacher identity and to type top four emoji that stand for their emotion and identity as an EFL teacher. Content analysis and descriptive analysis were employed for the analyses of the data.

*Findings*: According to the analysis, the metaphors were distributed to 8 distinct categories. As indicated by the findings related to the groups of metaphors, the labels appeared as 'a new identity', 'challenger', 'craftsperson', 'inspirer', 'nurturer', 'problem solver', 'traveller' and 'vitality'. Moreover, the most frequently typed top 4 emoji that participants associated with their professional identity commonly appeared to be positive illustrations that symbolize professional satisfaction with smiling face icons.

*Conclusion*: The conclusive evidence of the study suggested important implications for how these teachers regard themselves as professionals.

**Öz**

*Amaç*: Bu çalışma yabancı dil olarak İngilizce öğreten öğretmenlerin mesleki kimlik algılarını metafor ve emoji çıkarımları üzerinden araştırmayı amaçlamaktadır.

*Metod*: Çalışmaya Türkiye'deki farklı eğitim kurumlarında 40 yabancı dil olarak İngilizce öğreten öğretmen gönüllü olarak katılmıştır. Araştırmanın esas noktası olarak, öğretmenlerden mesleki kimliklerini temsil etmek adına ilgili metaforları seçmedeki temel nedeni açıklamalarının yanı sıra, temsili metaforlarla mesleki kimliklerini ifade etmeleri ve yabancı dil olarak İngilizce öğretmeni olarak duygularını ve kimliklerini temsil eden ilk 4 emojiyi yazmaları istenmiştir. Verilerin analizi için içerik analizi ve tanımlayıcı analiz kullanılmıştır.

*Bulgular*: Analizlere göre metaforlar 8 farklı kategoriye ayrılmıştır. Metafor gruplarıyla ilgili olarak, etiketler 'yeni bir kimlik,', 'meydan okuyucu', 'zanaatkar', 'ilham verici', 'besleyici', 'problem çözücü', 'gezgin' ve 'canlılık' olarak belirmiştir. Ayrıca, katılımcıların mesleki kimlikleriyle özdeşleştirdiği en çok yazılan emojiler genellikle gülen yüz ikonlarıyla mesleki memnuniyeti simgeleyen olumlu görseller olarak karşımıza çıkmıştır.

*Sonuç*: Çalışmanın nihai kanıtı bu öğretmenlerin kendilerini mesleki olarak nasıl düşündüklerine yönelik önemli çıkarımları ortaya koymuştur.

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## INTRODUCTION

There has been a wide range of studies addressing the scope of professional identity in educational research. Bearing multi-faceted concepts, identity as a professional term commonly involves similar keywords to be described. According to Varghese, et. al., (2005; p. 21) identity "is transformational, transformative, context-bound and constructed, maintained and negotiated via language and discourse". In its general sense, the conceptualization of identity is explicated as our understanding of ourselves and other people around us (Norton, 2000). It is imposed by how we see others, how they see us (Johnson, 2003; Varghese, 2006), and 'how we associate with the world' (Pennycook, 2001, p. 149) through our constant negotiated interactions. On the other hand, as asserted by Flores & Day (2006), improving professional identity is described as a continual and dynamic process that entails interpretation and explanation of personal experiences and values that can be affected by individual, collective, and cognitive factors. Within this issue, studies revolving around teacher identity occupy a large area of research. As one of the circles of contemporary pedagogical research, teacher identity has been an area of interest to identify and shed light on the modern teacher-self and the other social (Varghese, et. al., 2005), emotional (Song, 2016), or individual elements that shape it (Danielewicz, 2001). As an outstanding branch that merits investigation, research on language teacher identity has long since drawn interest on conflicting and demanding factors affecting the identity of language teachers (Farrell, 2011; Song, 2016; Varghese, et. Al. 2005). In this sense, whether the language teachers are native or not has a great inluence on their sense of professional identity. Looking through the prism with a holistic approach, it is possible to discern that a great bulk of English teachers are non-native (Matsuda & Matsuda, 2001) and the largest scale of these teachers practice in primary and secondary schools in various levels, while some of them teach at universities (Braine, 2014; Moussu & Llurda, 2008). Moreover, those non-native English as a second language (ESL) teachers commonly work under demanding conditions to maintain a more effective language teaching process that postulates them to build up innovations and curriculum reforms in teaching (Yuan, 2019) by struggling to improve learners' target language performance. Once they settle on innovations, they are demotivated due to lack of institutional support along with exam-based education mechanisms (Lee, 2016). The long working hours and heavy workload can turn out to be a source of mental stress and burnout that also affects their personal accomplishment, emotional wellbeing, and professional development (Kimsesiz, 2019; Mann and Tang 2012). In a similar context, Varghese, et.al. (2005, 22) claim that noticing the factors that form a classroom as a whole is essential as it is the teacher who is "at play in the classroom" to moderate the way "language teaching is played out". On a constantly transferring mechanism of education, teachers are expected to run off in all directions to keep up with the augmentation of knowledge and nonstop changes in society and education (Thomas &Beauchamp, 2011). The research in this area commonly involves narrative studies (Göktepe & Kunt, 2021; Güngör, 2016) and metaphorical analysis (Seferoğlu, et.al, (2009); Saban, et.al., (2007) to investigate the professional identity of teachers. In addition to utilizing metaphors, this study also employs emoji for the description of the professional identity of language teachers to elucidate their reflections as EFL teachers.

### Theoretical background

As the basic attempt in current research, the review intends to label and interpret the professional identities of language teachers to build a detailed and integral understanding of EFL teachers' professional reflection. Several authors have drawn on the definition of identity to refer to its role as a reflection of the self in the profession (Norton, 2000; Vargese, et. al., 2005). In its general sense, identity refers to our understanding of the relationship to the world and the construction of this relationship across time and space (Norton, 2000). Due to teachers' indisputable role in education, teacher identity also constitutes a great deal of interest in educational research (Beauchamp and Thomas, 2009; Beijaard, et.al., 2004; Danielewicz, 2001, Zembylas, 2003). As an autonomous individual, a teacher is assumed to possess a consistent identity that "serves as the repository of particular experiences in classrooms and schools, the site of thoughts, attitudes, emotions, beliefs, and values" (Zembylas, 2003, p. 107), to keep in touch with the colleagues and to realize themselves since the extensive and deep process of teaching involves the self (Danielewicz, 2001). As a complicated and exquisite process, teaching requires arduous work to consider the variables of learners and teaching conditions to keep pace with 'the ever-shifting context of the classroom' (Danielewicz, 2001, p.9). Empathy for students, field knowledge, learning sensibility, managing the practicability of the tasks or activities, adaptation to the culture of the workplace, and controlling the teaching process are required for teaching (Calderhead & Shorrock, 1997). Moreover, the teacher is the leader who directs the activities and manages the time effectively, hence the teachers need to adopt a professional identity (Danielewicz, 2001).

As stated by Thomas & Beauchamp (2011, p.762/763), "the process of envisioning the self as a professional is a crucial stage in the development of an effective teacher identity". Teachers are strongly affected by their teaching environments (Flores & Day, 2006). For a teacher, the notions "who am I?" and "who am I as a teacher?" are closely related and endorse the complex nature of identity development. In this respect, how to analyze professional identity is of equal importance. In particular, the use of metaphors is one of the most suitable approaches in examining the aspects of identity (Knowles, 1994; Thomas & Beauchamp, 2011). Widely considered to be a key driver in identifications, metaphor is described as "analogic devices that lie beneath the service of a person's awareness and serve as a cognitive device as a means for framing and defining experience to achieve meaning about one's life" (Massengil, Shaw, & Mahlios, 2008, p. 35). On the same description, Yob (2003) previously stated that "a

metaphor is employed when one wants to explore and understand something esoteric, abstract, novel or highly speculative" (p.134). In this sense, metaphors carry instrumental value for self-reflection and interaction as well as mind-setting that impacts their cognition of the self and the world (Moser, 2000). To unearth this complication, Oxford et al. (1998, 4) suggested that metaphor "involves employing a familiar object or event as a conceptual tool to elucidate features of a more complex subject or situation". As metaphors involve the educational values, beliefs, and principles of teachers, they also reveal evidence for professional growth (Gillis & Johnson, 2002). Thomas and Beauchamp (2011) noted that they found eliciting teachers' notions of their professional identity through metaphors highly acceptable as they enable vivid descriptions through the poetic nature of metaphors allowing them to describe themselves in simple and descriptive ways.

Moreover, as one of the most prominent figures in the field of computer-mediated communication, emoji are widely accepted as vivid and symbolic non-verbal elements as an alternative to the reflection of ideas, moods, and emotions (Bai, et. al., 2019; Troiano & Nante, 2018). To put it in simple terms, the word 'emoji' is a combination of 'e' (picture) and 'moji' (character) in Japanese with predefined codes that represent emotions, feelings, facial expression, gestures, objects, etc. (Rodrigues et al., 2017). Hence, what is demonstrated here is that an emoji enables users to express their emotions, moods, and feelings to the interlocutor through symbolic non-verbal elements in computer-mediated communication (Troiano & Nante, 2018) particularly for online text-based communication on smartphones (Novak, et. al.,2015). What is more, they are meaningful and emotional characteristics frequently used in online communication (Bai, et.al., 2019). Although there may be some varieties in the tendency of using emoji by males and females (Chen Z. et al., 2018; Prada et al., 2018; Rodrigues et al., 2017; Tossell et al., 2012), the selection of emoji can depend on individual and demographic influences (Bai, et.al.,2019).

The growing amount of literature shows that, among all other branches of teaching, foreign language teachers also attract the attention of many researchers for the configuration of their professional identity (Flores & Day, 2006; Thomas & Beauchamp, 2011). Referring to the issue, several studies emerged to validate evidence and disseminate major insights for the configuration of EFL teachers' identity associated with their professional identification. Upon the same issue, studies on language teacher identity in Turkey yielded promising results in terms of teachers expressing themselves (Akcan, 2016; Güngör, 2016; Keskin & Zaimoğlu, 2021) and equating themselves with metaphors (Saban et. Al., 2007; Seferoğlu, et.al., 2009; Yeşilbursa, 2012). These studies on language teachers' perceptions for self-reflecting on their identities highlight repository results relating to their self-perception, emotions, language skills, and competencies as an English as a foreign language (EFL) teacher. A comparatively recent reference can be attributed to Keskin & Zaimoğlu (2021) who found out that with a stable professional identity, Turkish EFL teachers were mostly committed to their personal growth and development, in addition to considering students' needs and issues related to the school they work. In a narrative study that investigated two EFL teachers' reflections on their environment, behaviors, beliefs, competencies, and missions entitled as teacher identity concept, Güngör (2016) found that teachers demand supporting community for practice and reconciled system for mentoring that enables them for self-reflection in the teaching context. To enable teachers' identification with their teaching profession, some of the studies were directed to associate their identity with metaphors (Saban, et. Al. 2006; Yeşilbursa, 2012). In another study conducted by Saban, et. al. (2006), research results implicated that teachers' conceptualization about teaching and learning is liable to depend on some cultural and demographic factors such as gender and their particular experiences once as a learner. Also, the findings of the study strongly suggested that prospective teachers have a system of metaphors to conceptualize their understanding of teaching and learning. In her study investigating perceptions of English language instructors about relating their professional identities, Yeşilbursa (2012) unearthed that patterns of metaphors fit into distinct groups based on the frequency of metaphors and that her findings shared similar results with the international literature on metaphor. Additionally, as inferred from the study by Atay & Ece (2009); Turkish prospective teachers felt conscious of their multiple identities and attached priority to their Turkish and Muslim identities. They also regarded learning English as a means to help them gain some distinct personal traits to become a more ideal language teacher. These prospective teachers also felt that they play a role as the transmitters of Western values and foreign cultures to the students in language courses.

## METHOD

Aiming to clarify EFL teachers' description of their teacher identity through metaphors and emoji, the following research questions were employed:

1. What is revealed by the metaphors relating to EFL teachers' sense of their professional identities?

2. What reasons lay behind EFL teachers' selections of metaphors for the description of their professional identity?

3. What are the most frequently selected emoji by the EFL teachers to describe their identity as professionals and how can they be evaluated in terms of their professional satisfaction?

### Participants

Through the course of the study, 40 EFL teachers voluntarily participated with a gender distribution of 6 males (15%) and 34 females (85%). Their teaching experience ranged between 5-23 years and they held degrees in ELT (English Language Teaching) (N=18), ELL (English Language and Literature) (N=3), and other departments (N=1). The participants were all non-native English speaking teachers with a Turkish language background and they were employed at state-run universities (N=7; 17,5%) and public

schools (N= 33; 82,5%) affiliated to the Ministry of National Education in Turkey. The questions were asked in English with the agreement of the participants.

### Data Collection

The data was collected through the completion of an online form that asked participants to fill in the blanks related to their demographic information and the research prompts about metaphor elicitation and emoji representation concerning their professional identity as EFL teachers.

### Procedure

The data were collected employing an online form involving two parts. The first part required participants to fill in their demographic information and, following the study by Thomas & Beauchamp (2011), in the second part participants were asked to complete three descriptive prompts as 'Being an English teacher is like...'; 'I preferred that metaphor because....'; and 'I can illustrate my self-identity as an English teacher with the following top four emoji:…'. In this way, teachers were asked to frame their professional identity with denotative metaphors and illustrative emoji and to provide a straightforward reason for selecting the related metaphor to represent their teacher identity. All of the participants (N=40) that were sent invitation links for participation consent replied to the form back through e-mails and a social media communication program. Ethical approval was granted from the University Ethics Committee before data collection began. The replies from the participants were later transcribed and coded by the researcher and a colleague who was blind to the process with digital codenames for ensuring anonymity. To facilitate the analysis, each participant was coded by sequential digits. The data was later transmitted to a statistical package program and for the analysis of the data, content analysis was employed to ensure the reliability of the results. Emojis were defined by their explanation taken from the official site of emoji www.emojipedia.org.

### Data Analysis

To analyze the data, content analysis was used, and the data were coded by hand on the computer database. Related to the first research question, all metaphors by each participant were identified and categorized based on the frequency of the answers given by the participants. The metaphors from each participant were separately identified and were grouped according to their themes about professional identity that emerged as possible categories. For the analysis of the metaphors, conventional content analysis was employed. This type of design is preferred when preconceived categories are avoided (Kondracki & Wellman, 2002) and when categories are allowed to flow from the data (Hsieh & Shannon, 2005). In addition, participants' explanations related with the second question were rendered within each category of metaphors in a narrative approach.

For the analysis of the emoji elicitations, summative content analysis was generated to quantify certain words or items in a text to understand the contextual use of the words or content and to focus on the frequency of specific content (Kondracki & Wellman, 2002). Hence, in this step, descriptive analysis was employed for the definition of their frequency at https://www.online-utility.org/text/analyzer.jsp that calculates the most frequent phrases, frequencies of words and their lexical density. Both the interrater reliability and descriptive analysis were done through SPSS 21., a statistical package program. For the analysis of the emoji elicitations, descriptive analysis was employed for the definition of their frequency. Both the interrater reliability and descriptive analysis were done through SPSS 21., a statistical package program.

## FINDINGS

The results of the content analysis suggested that 40 metaphors could be grouped into 8 clusters. The degree of interrater agreement was found highly satisfactory (The Cohen's Kappa –k=.91) as the agreement among raters was strong (McHough, 2012) which also shows that metaphors could be well represented by these clusters. As indicated by the findings related to the groups of metaphors, the labels are as follows: 'a new identity', 'challenger', 'craftsperson', 'inspirer', 'nurturer', 'problem solver', 'traveller' and 'vitality'. With regard to the second research question, participants' reasons of why they chose the related metaphors are also clarified within each category.

Within the 'a new identity' category, one participant marked that he felt 'like two people in one body' because he felt himself with two distinct identities (P.2). Another participant (P.7) stated that being an English teacher is like 'having a twin' because she could also express herself in another language. Similarly, another participant (P.9) described herself as 'having a second personality' causing her to feel that whenever she taught English, she felt as if she was someone else, not herself. Within the same category, two other participants (P.5; P.8) conveyed that they felt two distinct personalities in their existence, as P.8 noted that she could teach a new and advantageous language to the learners. P.14 compared being an English teacher to acting the main character of a story and added that she chose this metaphor because they have the chance to educate people like the main character of a story.

In the cluster of 'craftsperson', participants rendered divergent associations for becoming an EFL teacher. Some of the participants regarded being an English teacher as acting on the stage as an actor/actress (P.29; P.31) to take students' attention through the lesson. In this category, one of the participants (P.32) associated herself with 'an ambulance driver' that is called in

case of emergency when they need any help in English, another participant (35) resembled herself to 'a bee that makes honeycomb' through hard work to be beneficial for the students. Yet, another participant (38) chose the metaphor 'farmer' as she believed that teachers make a great effort for their students as farmers do for their cultivation. Similarly, P. 23 used the metaphor 'gardener' to describe her identity as an EFL teacher. Further, she explained that as they plant a little seed, they see a huge tree by time through patience and effort. Distinctively, another participant (P. 3) noted that it is just like working as 'a cultural ambassador' emphasizing that language and culture are closely integrated, and the teachers are the weavers of this interrelation.

In the nominative case, the metaphors in the 'nurturer' category included 'parent' and 'mother'. Within this category, two of the participants (P.1; P.26) associated being an English teacher with being a 'parent' who teaches the native language, and also who helps, guides, reflects, and builds a better understanding for the students to lead them to build their autonomy as a learner. Two of the participants (P.36; P.40) chose the metaphor 'mother' giving the reason that they feel an endless love and empathy for each student as that of a mother and they approach each child as if they were their mother because they have time together, learn new things, and understand each other.

Viewing the matter from a different angle, some of the participants associated being an English teacher with a 'traveller'. One of the participants noted that it just reminded her of a journey (P. 11). The other participants stated that it was just like being a traveller in their hometown (P. 22), flying to unknown places (P.17), and being a world traveller who could discover new things each day (P.39).

Another mostly associated metaphor was the English teacher as a 'problem solver'. Mainly two of the participants (P.16; P.21) assumed a role as a 'problem solver' defining that both learning and teaching a foreign language is a long-term process to be resolved. One of the participants (P. 6) elicited 'being a key' as a metaphor for being an EFL teacher giving the reason that they open doors of a new world for the students. Some of the participants stated that they regarded themselves as a 'social witch' (P.28), and a 'magician' (P.20) whom people expect wonders, and two of the participants (P. 30; P.34) stated that an English teacher is like a hero because when people need any help in English, they call them.

The metaphor categorized under the heading of 'inspirer' involved evocative metaphors. Within this category, P.12 wrote that it's just like inspiring and breaking the prejudice of the learners and it's possible. P. 13 noted that being an EFL teacher is like 'creating question marks in brains' to make the little brains start to question. Moreover, being an EFL teacher resembled a 'shining star' (P. 15) and a light lantern (P. 25) symbolizing the bright side of teaching various things related to a foreign language and reflecting them to the students.

Another category was 'challenger' pinning on various struggles of EFL teachers. P.4 stated that her duty is just like that of a little bird carrying heavy things by trying more yet achieving less. P. 10 noted that being an EFL teacher is like pushing the limits as a human being, yet it was possible when they struggled. Two of the participants (P.24, P.27) reflected that being an English teacher is like an 'ugly duckling' depending on the reason that their role may change over time (P.24) and that they weren't valued and appreciated by society though the potential that could lead the innovation and improvement not only mentally but also socially (P.27). Another participant (P.33) noted that it was like swimming backward in the middle of the ocean due to the wayward but exciting process of teaching. Another metaphor in this category was figured by P. 19 defining that being an English teacher was like flowing on water sometimes diving to find the shells that have pearls. In this scenario, the participant also explained that pearls represented only the gifted ones who can grab the core meaning in learning a foreign language.

The last category 'vitality' included two distinct metaphors. As explained by P. 37 being an English teacher was like feeling a never-ending passion because she felt that teaching a foreign language was charming. The other participant (P. 18) noted that it was like a 'blooming flower' stating that 'we go further from where we start teaching. While teaching, we learn a lot'.

Moreover, participants propounded consistent and rational explanations for their choice of metaphors in identification with their professional identity as EFL teachers. To give an illustration, in the category of 'a new identity', participants stated that they felt that they took on a different identity as an English teacher and they mentioned their struggle in teaching English in the category of 'challenging'. They identified their professional identities with different occupational groups such as 'ambulance driver' or 'actor' in the category of 'craftsman' and emphasized the inspiring aspects of their professions in the 'inspiring' category. In the 'nurturing' category, teaching was identified with 'motherhood', and in the 'problem solver' category, the aspect of the profession was emphasized on producing solutions to problems. In the category of 'traveller' the advantageous aspect of traveling as an English teacher was conveyed and last but not least 'vitality' category symbolized their passion and improvement as a foreign language teacher.

In response to the third research question, participants aligned their feelings for being an EFL teacher with representative emojis. Some of the emojis are omitted since they didn't convey any frequency as they were preferred only once (N=50). For the total length of emoji (N=25), their frequency averaged between 2-9 (Std.= 2,21). Table 1 displays most frequently typed emoji for the representation of professional identity of EFL teachers.

**Table 1. The Most Frequently Typed Emoji for The Representation of Professional Identity of EFL Teachers**

| Emoji | Frequency | Name | Official Definition |
|---|---|---|---|
|  | 10 | Smiling face with hearts | a range of happy, affectionate feelings, especially being in love |
|  | 9 | Star-struck | amazing, fascinating, impressive, or exciting. |
|  | 9 | Smiling face with smiling eyes | genuine happiness and warm, positive feelings |
|  | 8 | Partying face | celebrating joyous occasions and enjoying good times. |
|  | 8 | Smiling face with sunglasses | confident, carefree attitude or that something is excellent |
|  | 7 | Nerd face | People calling themselves nerds in a self-deprecating way |
|  | 6 | Smiling face with open hands | love and care, or warm, positive feelings. |
|  | 5 | Thinking face | pondering or deep in thought |
|  | 5 | Face with monocle | pondering, considering, or questioning something, sometimes with a sense of skeptical or ironic observation |
|  | 4 | Smiling face with heart - eyes | enthusiastic feelings of love, infatuation, and adoration |
|  | 4 | Globe Showing Europe-Africa | used to represent Earth and international affairs more generally. |
|  | 3 | Grinning face with smiling eyes | general happiness and good-natured amusement. |
|  | 3 | Smiling face with halo | angels, prayers, and blessings |
|  | 3 | Woman running | Runner |
|  | 3 | Grinning face with sweat | Intended to depict nerves or discomfort but commonly used to express a close call, as if saying *Whew!* and wiping sweat from the forehead. |
|  | 3 | Smiling face | Conveys a wide range of warm, positive feelings, including love, happiness, and gratitude |
|  | 3 | Face with tears of joy | something is funny or pleasing |
|  | 3 | Thumbs up | approval |
|  | 2 | Face with raised eyebrow | suspicion, skepticism, concern, consideration, disbelief, and disapproval |

| Emoji | Frequency | Name | Official Definition |
|---|---|---|---|
|  | 2 | Beaming face with smiling eyes | expresses a radiant, gratified happiness |
|  | 2 | Relieved face | contentment, calm, peace, and relief |
|  | 2 | Folded hands | meaning *please* or *thank you* |
|  | 2 | Clapping hands | used multiple times can be used as a round of applause. |
|  | 2 | Woman technologist | working in the field of technology. |
|  | 2 | Woman teacher | the intention of teaching a class |

(Names and definitions were retrieved from www.emojipedia.org)

As can be depicted from the table above, smiling face with hearts (N=10) has been typed with most frequently followed by smiling face with smiling eyes and star struck occurring 9 times and smiling face with sunglasses and partying face for 8 times. The other most frequent emoji appearing were nerd face (N=7), smiling face with open hands (N=6), thinking face (N=5), face with monocle (N=5), smiling face with heart eyes (N=4), and a globe showing Europe (N=4). Emojis with less frequency were arranged as grinning face with smiling eyes, smiling face with halo, a woman running, grinning face with sweat, smiling face, thumps up, and face with fears of joy each typed for 3 times by the participants. Emojis with the least frequency covered face with raised eyebrow, beaming face with smiling eyes, relieved face, folded and clapping hands, woman technologist and woman teacher all occurring for 2 times.

Based on the official name of the emojis, word frequency was calculated. Among 81 words, frequency of some top phrases containing 2 words is listed in Table 2 below.

**Table 2. Frequency of some top phrases containing 2 words**

| Some top phrases containing 2 words (without punctuation marks) | Occurrences | % |
|---|---|---|
| face with | 12 | 14,8 |
| smiling face | 7 | 8,6 |
| smiling eyes | 3 | 3,7 |
| with smiling | 3 | 3,7 |
| grinning face | 2 | 2,4 |
| face smiling | 2 | 2,4 |
| face face | 2 | 2,4 |

For the evaluation of participants' satisfaction, the word frequency of emoji labels of smiling face (8,6%), smiling eyes and with smiling (3,7%) can be regarded as evidence for positive reflections. In other words, considering that these emojis were selected to mirror their professional identity, participants most frequently referred to positive representations described by smiling face moods followed by skeptical faces and positive approvals by 'smiling face' with extras such as 'hearts', 'open hands', 'sunglasses', 'halo'; 'thumps up'; 'clapping hands', and content face moods. Teachers also identified their moods as a woman 'running', 'technologist', and 'teacher' which describe their working field and desire. As a result, it is inferred that emojis selected by the participants generally evince positive, content, faithful, loving, and grateful moods for their professional identity as EFL teachers.

## DISCUSSION

Teaching identity has been an issue with several clusters around it. Relatedly, the aim of the current study was to investigate the professional identity of EFL teachers. On a constantly transferring mechanism of education, teachers are expected to run off in all directions to keep up with the augmentation of knowledge and nonstop changes in society (Thomas &Beauchamp, 2011). As it is clear from the literature, teachers are also expected to modulate their conformity to the shifting contexts in the education system (Danielewicz, 2001). Relatedly, schools are also expected to satisfy these needs concordantly. As metaphors involve the educational values, beliefs, and principles of teachers, they also reveal evidence for professional growth (Gillis & Johnson, 2002). Moreover, emojis permit users to illustrate their emotions, moods, feelings, etc. in computer mediated communication (Troiano & Nante, 2018). According to the findings, participants generally described themselves as having different roles as EFL teachers. To give an illustration, they noted that they regard themselves as having another identity, as a problem solver, as a traveller, a nurturer, a challenger, and an inspirer. What is demonstrated by the variety of metaphors here is that teachers individually carry a broad range of perspectives for the reflection of their professional identities. Similarly, this diversity draws a parallel line between what has been expressed in the preceding literature and what has been conveyed through the metaphor elicitation in that identity is a continual and dynamic process of personal interpretation and explanation of experiences and the values that can be attributed to an individual or collective thinking mechanism of the self (Flores & Day, 2006). On the other side, identity is clarified as the understanding of ourselves and the people around us (Norton, 2000), and these metaphors reflect how participants see themselves and how they associate with the world (Johnson, 2003; Pennycook, 2001). Moreover, professional identity necessitates interpretation of individual experiences and values that are open to influence by a personal or collective factor that feeds it on the way of improvement (Flores & Day, 2006). Relatedly, the findings in the area commonly ascertained positive and favorable labels (Saban, et. Al, 2006; Yeşilbursa, 2021) with also bright, stable, and delighted views for the professional identity of EFL teachers in Turkey (Atay & Ece, 2009; Keskin & Zaimoğlu, 2021). The distribution of metaphors in this study also revealed that teachers ideal themselves with positive and faithful roles in common. The findings from the metaphor analysis of the current study are also in line with the findings from the literature (Saban, et.al., 2006; Seferoğlu, et. al., 2009; Yeşilbursa, 2021). Scrutinizing through a wide-angle, it is possible to generalize that some notable examples are common in all distributions in the aforementioned studies such as teacher as a 'nurturer', 'guide', representing a 'craftsperson', and teacher with 'facilitative' and 'leader' roles (Saban, et. Al, 2006; Seferoğlu, et. al. 2009; Yeşilbursa, 2021).

On the other hand, as revealed by the findings from the emoji associations, participants generally mirrored positive and satisfied moods as their sense of being an EFL teacher. The emojis are meaningful and emotional characteristics used in online communication (Bai, et.al., 2019). To our knowledge, no study to date has examined the definition of professional identity of EFL teachers by using emoji elicitation. Thus, it is possible to assume that emojis, as indicators of individual reflections of moods and emotions mainly showed constructive and positive symbols for the representation of how participants felt as an EFL teacher. This shows that almost all of the participants reflected that they feel content, grateful, and affectionate to become an EFL teacher.

## CONCLUSION

There has been a number of studies looking into the professional and pedagogical issues regarding EFL teachers' identities in Turkey. Based on this background, the key contribution of this work was to describe how EFL teachers identify their professional identities through the metaphor and emoji they choose to reflect their teaching selves. The results pervade important insight into how these teachers see themselves as professionals. As the main focus of the study, teachers were asked to render their professional identity with metaphors with a straightforward reason for selecting the pertinent metaphor to represent their teacher identity and to type the top four emojis that stand for their emotion and identity as an EFL teacher. The primary findings of the research revealed positive and favourable descriptions with metaphors. Besides all these findings, consistent results indicated that teachers also associated themselves with positive emojis, particularly the ones with smiling face expressions with particular extras such as hearts, heart eyes, halo, and more that show their delight and gratitude to become an EFL teacher. In retrospect, the conclusive evidence of this current study suggests that EFL teachers are commonly satisfied with their profession. Accordingly, the metaphor and emoji analyses can be used to aid prospective teachers to reconsider their values, ideas, identity construction, and emotional reflection about teaching EFL.

As a last note, the study was limited in terms of the number of the sample believing that with a larger sample the study would suggest more categories of metaphors and more illustrative emoji. As reported by Morse & Field (1995), to keep the groups broad enough, it is better to form clusters between 10-15. Yet the categories in the current study were limited to 8 groups to form meaningful clusters depending on the data. Relatedly, further research in this field would provide brighter insight into the professional identity of EFL teachers in Turkey and the contributions made would be of wide interest.

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**Statements of publication ethics**

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

**Ethics Committee Approval Information**

The ethics committee approval was obtained from Kırşehir Ahi Evran University with a document number of 2021/9/16 on 23/12/2021. All participants provided written informed consent prior to enrolment and data collection in this study.

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| Research Article / Araştırma Makalesi |

# Examination of the Relationship Between Teachers' Organizational Change Fatigue Levels and the Organizational Resilience Levels of Secondary Education Institutions

# Öğretmenlerin Örgütsel Değişim Yorgunluğu Düzeyleriyle Ortaöğretim Kurumlarının Örgütsel Dayanıklılık Düzeyleri Arasındaki İlişkinin İncelenmesi

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**Keywords**

1. Organisational change fatigue
2. Organisational resilience
3. Secondary education institution

**Anahtar Kelimeler**

1. Örgütsel değişim yorgunluğu
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3. Ortaöğretim kurumu

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## Abstract

*Purpose:* The aim of this research is to determine the relationship between organizational change fatigue levels of teachers working in secondary education institutions and organizational resilience levels of these institutions.

*Design/Methodology/Approach:* The research was organized in relational screening model. The population of the research consisted of teachers working in high schools located within the borders of Kastamonu province. Proportional stratified sampling method was used in the study. The sampling included 313 teachers. In the study, the "Organizational Change Fatigue Scale", which was developed by Bernerth et. al. 2011 and adapted to Turkish in 2020 and whose validity and reliability study was conducted by Limon, was used to measure the organizational change fatigue level of teachers. In order to measure the organizational resilience level of secondary education institutions, the "Organizational Resilience Scale" developed by Kantur and Say in 2015 was used. Pearson Product Moments Correlation Coefficient, Independent Sample t-test, One-Way Anova and Regression Analysis techniques were used in the analysis of the data.

*Findings:* In the analyzes made, it was concluded that teachers working in high schools experienced change fatigue at the level of "agree", that high schools were resilient at the level of "agree", that there was no significant relationship between teachers' organizational change fatigue levels and organizational resilience, and that the level of change fatigue was not a significant predictor of organizational resilience.

*Highlights*: In the study, it was seen that the organizational change fatigue levels of teachers did not change significantly according to the gender and seniority variable, but showed a significant change according to the school type variable. Teachers working in Fine Arts High School experience statistically significantly less change fatigue than teachers working in other school types. In addition, Vocational and Technical Anatolian High Schools are significantly less resilient than other high school types

## Öz

*Çalışmanın amacı:* Bu araştırmanın amacı, ortaöğretim kurumlarında görev yapan öğretmenlerin örgütsel değişim yorgunluğu düzeyleriyle ortaöğretim kurumlarının örgütsel dayanıklılık düzeyleri arasındaki ilişkiyi saptamaktır.

*Materyal ve Yöntem:* Araştırma ilişkisel tarama modelinde düzenlenmiştir. Araştırmanın evrenini Kastamonu ili sınırları içerisinde yer alan ortaöğretim kurumlarında görev yapan öğretmenler oluşturmuştur. Araştırmada oranlı tabakalı örnekleme yöntemi kullanılmıştır. Örnekleme 313 öğretmen girmiştir. Araştırmada, öğretmenlerin örgütsel değişim yorgunluğu düzeyini ölçmek için Bernerth vd. tarafından 2011 yılında geliştirilen ve Limon tarafından 2020 yılında Türkçe'ye uyarlanıp geçerlilik ve güvenirlilik çalışması yapılan "Örgütsel Değişim Yorgunluğu Ölçeği – Change Fatique Scale" kullanılmıştır. Ortaöğretim kurumlarının örgütsel dayanıklılık düzeyini ölçmek için ise Kantur ve Say tarafından 2015 yılında geliştirilen "Örgütsel Dayanıklılık Ölçeği –Organizational Resilience Scale" kullanılmıştır. Verilerin analizinde Pearson Momentler Çarpımı Korelasyon Katsayısı, Bağımsız Örneklem t-testi, Tek Yönlü Varyans Analizi ve Regresyon Analizi tekniklerinden yararlanılmıştır.

*Bulgular:* Yapılan analizlerde, ortaöğretim kurumlarında çalışan öğretmenlerin "katılıyorum" düzeyinde değişim yorgunluğu yaşadığı, ortaöğretim kurumlarının "katılıyorum" düzeyinde dayanıklı olduğu ve öğretmenlerin örgütsel değişim yorgunluğu düzeyleriyle örgütsel dayanıklılık arasında anlamlı bir ilişki olmadığı, değişim yorgunluğu düzeyinin örgütsel dayanıklılığın anlamlı bir yordayıcısı olmadığı sonuçlarına ulaşılmıştır.

*Önemli Vurgular:* Araştırmada öğretmenlerin örgütsel değişim yorgunluk düzeylerinin cinsiyet ve kıdem değişkenine göre anlamlı bir değişim göstermediği, okul türü değişkenine göre ise anlamlı bir değişim gösterdiği görülmüştür. Güzel Sanatlar Lisesi'nde görev yapan öğretmenler, diğer okul türlerinde görev yapan öğretmenlere göre istatistiksel olarak anlamlı derecede daha az değişim yorgunluğu yaşamaktadır. Ayrıca Mesleki ve Teknik Anadolu Liseleri diğer lise türlerine göre önemli ölçüde daha az dayanıklıdır.

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## INTRODUCTION

Organizations are constantly changing to meet environmental expectations locally, regionally and globally. However, resistance and conflict arise when human beings, who essentially need order, balance, stability, predictability, and maintaining a sense of the status quo, are confronted with organizational changes that directly challenge the status quo. When change occurs repeatedly, individuals begin to feel depressed, stressed, adaptive abilities decrease, uncertainty increases, and individuals gradually begin to lose control. Therefore, individuals cannot harmonize their thoughts and actions as they constantly expend energy to keep up with changes. This situation, known as "organizational change fatigue" in the literature, has been defined by McMillan and Perron (2013) as "intense stress, fatigue and burnout associated with continuous and rapid change in the workplace". The fact that organizations try to implement many changes at the same time, especially before a previous change attempt is evaluated and completed, causes employees to express negative views on organizational change. Employees' perception of too much change effort in the organizational environment can increase their job stress, decrease job performance and morale, increase their absenteeism, and result in turnover and job dissatisfaction (Dool, 2009). Employees' feelings that a lot of organizational changes have occurred can also lead to a decrease in organizational burnout and commitment (Bernerth et al., 2011).

In the relevant studies examined in the literature, it is seen that change fatigue increases personnel circulation (Ead, 2015; Stensaker et al., 2002) and turnover intention (Bernerth et al., 2011) while it decreases organizational commitment (Bernerth et al., 2011; Ead, 2015) and organizational effectiveness. (Stensaker et al., 2002). In addition, while change fatigue reduces employee satisfaction and motivation (Stensaker et al., 2002), it causes psychological problems such as tension, withdrawal and exhaustion (Bernerth et al., 2011; Ead, 2015). Experiencing intense psychological stress can also increase the risk of physical and psychological diseases in individuals (Hart, 2009).

Change, which has become an inevitable and indispensable phenomenon for individuals, societies and organizations, is a concept that is frequently mentioned today. Today, there is a rapid change in technological, cultural, political, economic and many other areas (Hazır, 2003). Organizations also become more fragile in the face of constantly changing, uncertain and unexpected destructive events (Karaköse et al., 2020). Under these conditions, organizations need to have the ability to resist, survive and recover in crisis situations (Xiao & Cao, 2017). Organizational resilience is the capacity of organizations to predict crises, react to short-term shocks and adapt to unexpected situations and it is important for organizations to adapt to today's dynamic world (Rexhepi, 2016). In order to increase their level of resilience, organizations should respond organizationally to environmental turbulences and unexpected destructive events and tend to overcome them (Burnard & Bhamra, 2011; Bhamra et al., 2011).

When the research results related to organizational resilience are examined in the literature, it has been found that there is a significant and positive relationship between organizational resilience and organizational performance (Parsons, 2010; Suryaningtyas, et al., 2019), organizational learning positively affects organizational resilience (Kozcu, 2020) and there is a high positive relationship between organizational resilience, organizational sustainability, and social and managerial sustainability (Sezen & Argon, 2020).

Educational organizations are trying to maintain their existence in an environment where changes occur sometimes gradually and sometimes as unexpected crisis situations. These changes are reshaping the world, the belief systems of people and communities (OECD, 2023). In the face of this uncertain future, it is expected that educational organizations will prepare students for jobs that have not yet been created, to overcome social problems that we cannot even imagine, and to use technologies that have not yet been invented, and to continue on their way more robustly by successfully coming out of crisis and unexpected situations. In recent years, climate change, natural disasters, global migration and epidemics such as Covid-19 have forced educational organizations to change (OECD, 2019). In these crisis situations, educational organizations are expected to effectively manage the crisis situation, to minimize the destructive effects of the crisis situation, to implement the necessary changes in a timely manner, to see the future in a way, adapt to the future and shape the future. Sudden crisis situations negatively affect teachers as well as educational institutions. Especially in our country, where many change initiatives are started at the same time without evaluating the results, the stress and fatigue experienced by teachers increased even more during the Covid-19 pandemic period. The difficulties encountered in subjects such as the transition from the traditional classroom environment to distance education, the inadequacy of distance education in terms of educational content, the deterioration of the work-life balance of teachers, time management, technological infrastructure, the ability to use computers and programs have been the biggest sources of stress during the pandemic period (Kandemir, A. & Sezgin Nartgün, Ş., 2022). In addition, the inability to manage the uncertainty created by the pandemic well, centralized late decisions, the unclear and unambiguous decisions, the sudden and frequent changes of the decisions taken, and the sometimes conflicting of the decisions with the regulations increased the stress and workload of teachers and school administrators (Kara & Bozkurt. , 2021). As can be seen, organizational resilience and organizational change fatigue are two very important concepts, especially in times of crisis and periods of intense change. In our country, there is no research on the relationship between organizational resilience and organizational change fatigue in educational organizations. For this reason, organizational resilience levels of educational organizations and organizational change fatigue levels of teachers could not be examined in detail. It is thought that this

research, which aims to examine the relationship between the organizational change fatigue levels of teachers working in secondary education institutions and the organizational resilience levels of these institutions, will contribute to the literature and shed light on a better understanding of these two concepts.

## Purpose

The aim of this research is to determine the relationship between organizational change fatigue levels of teachers working in secondary education institutions and organizational resilience levels of these institutions. For this purpose, answers to the following questions will be sought.

1. What is the organizational change fatigue level of teachers working in secondary education institutions? 2. Does the organizational change fatigue level of teachers working in secondary education institutions change according to gender, seniority and type of institution? 3. What is the organizational resilience level of secondary education institutions according to teachers' opinions? 4. According to teachers' opinions, does the organizational resilience level of secondary education institutions change according to the type of institution they work in? 5. Is there a significant relationship between organizational change fatigue levels of teachers working in secondary education institutions and organizational resilience levels of secondary education institutions? 6. Is organizational change fatigue levels of teachers working in secondary education institutions a significant predictor of organizational resilience level of secondary education institutions?

## Organizational Change Fatigue

Change is inevitable as an internal process, and today this idea is more prominent than ever. In fact, many organizational values and mission statements focus on concepts such as continuous improvement and learning, emphasizing change as an integral part of an organization's culture and strategy (Orlikowski, 1996). As organizations embark on change initiatives more frequently and more rapidly, it has become clear that organizational change can have potentially negative consequences if not managed systematically. Among these negative results are increased stress and tension in employees, resistance to change initiatives and a sense of burnout (Bruckman, 2008; Hansson et al., 2008; Maslach et al., 2001).

Change fatigue is associated with feelings of burnout and stress (McMillan & Perron, 2013), and these feelings may result in failure in the change process and less enthusiasm for change efforts (Dilkes et al., 2014). Change can overwhelm the individual and if this emotion is widespread, it can lead to organizational chaos (Stensaker et al., 2002). Change fatigue can be defined as the perception of excessive change that causes an individual to experience stress and approach change negatively (Deschenes, 2019). Extreme change refers to situations in which several seemingly unrelated and sometimes contradictory changes are made simultaneously and a new change emerges before the ongoing changes are complete and the benefits of these changes are seen (Johnson et al., 2016).

The concept of change fatigue is different from similar concepts such as change cynicism, change resistance, burnout and psychological uncertainty. In the concept of change resistance, individuals respond actively to change, while in the concept of change fatigue, individuals accept the organizational change that affects their daily working lives and give a passive reaction to the change (McMillan & Perron, 2013). Change fatigue can then bring about change resistance (Stensaker et al., 2002). Change fatigue and change cynicism are different concepts (Bernerth et al., 2011; Elving et al., 2011). Change cynicism focuses on the possibility of success and tends to blame individuals for failure, but the focus of change fatigue is mainly on the amount of change and the intense stress this situation elicits (Bernerth et al., 2011). The term psychological uncertainty differs from change fatigue in terms of the temporal focus of change. While psychological uncertainty is associated with an individual's ability to accurately predict the future, change fatigue focuses on current extreme change (Bernerth et al., 2011). Burnout is the result of experiencing change fatigue. Burnout can be considered as a possible antecedent of organizational change fatigue (Bernerth et al., 2011). Although the term change fatigue is associated with most of the concepts mentioned above, it is a concept with distinguishable causes, consequences, and characteristics.

While the number of changes is definitely a factor in the emergence of change fatigue, the way managers initiate, manage and implement change directly affects whether employees will experience change fatigue. Therefore, coping with change fatigue requires more than reducing the number of changes. Organizations should change the way their way of thinking about what, when and how they implement it. Turner (2021) recommends six actions that can help prevent, reduce, and overcome organizational fatigue:

1. Facilitating change from the perspective of the whole organization
2. Initiating a new change initiative after the expected output from each change is achieved
3. Developing organizational change leadership strengths
4. Expanding the level of participation of those who will be affected by the change
5. Allocating appropriate time for people affected by change
6. Creating organizational architecture of change

If employees are not informed about the change initiative and cannot understand the underlying cause of the initiative, they cannot prepare themselves for the change and cannot implement the change. The extent to which employees should be informed is related to organizational needs. However, employees should be informed about the change coming and they need to express their thoughts and questions about it freely. If the employees are forced to change without being informed and are not allowed to be a part of the change process, organizations create change fatigue. Change is always a stressful process to some extent. To avoid change fatigue and better deal with it when it arises, it is extremely important to think about the big picture when prioritizing changes, develop a long-term strategy for change, strengthen the organizational culture, and keep lines of communication open (Day, 2021).

## Change Fatigue in Educational Organizations

Change is a phenomenon that deeply affects all organizations including educational organisations. Educational organizations, which have undertaken the task of building the future of the country, must see the future, determine the change needs for the future and make the change permanent. Therefore, change in schools is extremely natural and inevitable (Beycioğlu & Aslan, 2010). Since educational organizations are both the cause and the result of change due to their social functions, they are affected by the changes in their environment and they also undertake the responsibility of initiating and directing the change as a social institution. For this reason, educational organizations should closely monitor social and technological changes and change themselves accordingly (Çalık, 2003).

Reform efforts at different scales are observed in Turkey during the period of different governments and Ministers of National Education. There is no stability and continuity in national education policies in this regard. The system undergoes significant and sudden changes almost every year especially in curricula, entrance to high schools and entry to higher education. Failure to seek a social consensus and insufficient consultation with teachers, students and parents before these changes harms the trust of students, who are the main subjects of education (Gür & Çelik, 2009). Due to the dominance of the centralized management approach in our country, changes are sent to educational organizations through laws and regulations as "from the top down" and educational organizations are expected to act according to these changes. In this management approach, students or stakeholders such as parents rarely involve in the decision-making process about change (Limon & Sezgin-Nartgün, 2020).

Especially in recent years, the ongoing changes in the education system in Turkey have occurred not only in the program but also in every field and level of education (Doğutaş, 2016). Elementary 1-5 classroom curricula have been renewed and the cognitive and constructivist approach has taken the place of the behavioral approach. The constructivist approach has brought performance and project activities with it. In 1997, eight-year uninterrupted education was started, and preparatory classes in Anatolian high schools were abolished. Later, twelve years of compulsary education (the 4+4+4 system) replaced eight years of compulsory education beginning from the 2012-2013 academic year. Starting from the 2017-2018 academic year, italic handwriting was replaced by vertical writing in the 1st grades and sound-based education was started. Starting from the 2005-2006 academic year, high schools were gradually increased to four years. In 2010, all of the general high schools in Turkey were converted to Anatolian high schools. Today, with the "Regulation of Educational Institutions Implementing Special Programs and Projects" of the Ministry of National Education No. 29818 dated 01/09/2016, some high schools have been given the status of "project schools" (qualified schools) and teachers and administrators have started to be directly assigned to these schools by the ministry. The entrance system to high schools has been constantly changing, first OKS, SBS, TEOG and finally LGS exams have been introduced. During this time, the university entrance system has also changed constantly. The exam, which was previously held in two sessions, namely ÖSS and ÖYS, started to be held in a single session under the name of ÖSS in 1999, in two sessions as YGS and LYS in 2010, and in two sessions as TYT and AYT in 2018. In addition to these changes, the regulation on selecting and assigning administrators to educational institutions has also changed frequently. In the 2023 Education Vision document of the Ministry of National Education, it is emphasized that there will be a program change in secondary education. Reducing the compulsory course hours in secondary education, reducing the variety of courses, restructuring the elective courses are among the targets of the new program.

In our recent past, we have witnessed intense change initiatives and rapid changes during the pandemic we experienced due to COVID-19. After the first Covid-19 case was seen in Turkey, face-to-face education was suspended in universities and all schools affiliated to the Ministry of National Education, and the distance education process started in Turkey in order not to interrupt the education process (Güler et al., 2022). During the process, the stress experienced by the teachers increased as a result of the constant changing and sometimes conflicting decisions regarding course hours, assessment and evaluation practices, and which grade levels to pass to face-to-face education. Distance education increased the workload of teachers, eliminated the concept of leisure, and caused burnout for teachers with low technological literacy (Metin et al., 2021). The fact that both the Ministry of National Education and teachers were unprepared for such crisis situations, the insufficient technological infrastructure in our country for distance education, and the ministry's inability to manage the process well increased the stress experienced by the teachers and caused them to lose motivation.

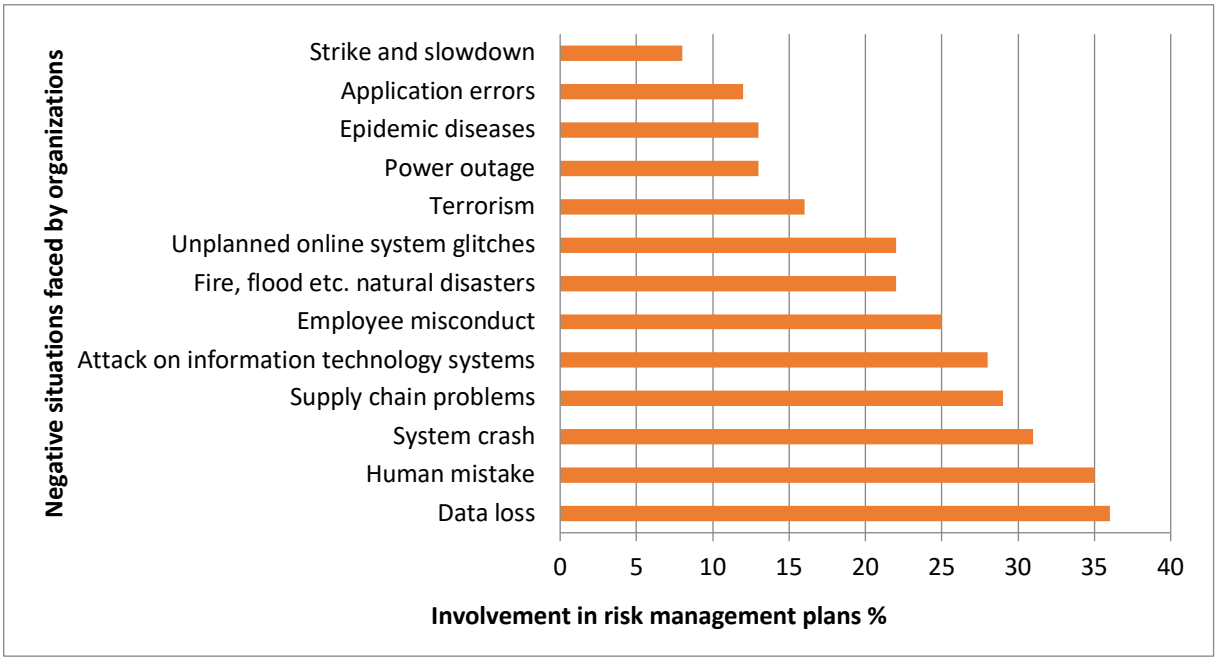
As can be seen, educational institutions in our country are subject to frequent changes. In such an environment, it is possible to say that teachers become more sensitive to change fatigue (Limon & Sezgin-Nartgün, 2020). If teachers begin to feel stress

and burnout due to change fatigue, teachers' efficiency in education will decrease and the expected results from change initiatives will not be obtained.

## Organizational Resilience

In today's world, organizations need to consider many environmental, economic and social factors in order to survive and continue their activities (Fiksel, 2003). While organizations are inevitably struggling with the threats brought by the crises and devastating events caused by these factors (Burnard & Bhamra, 2011), the unexpected survival and development of some organizations in these crisis situations has led researchers to examine this situation (Sutcliffe & Vogus, 2003). It has been suggested that some organizations' being minimally affected while struggling with changing environmental conditions, adapting easily to new situations and surviving in crisis situations is related to the concept of "resilience", which is a new phenomenon in organizational science (Burnard & Bhamra, 2011). Resilience can be defined as a capacity that a person has to successfully adapt to stressful situations and maintain mental health in the face of difficulties. It also means coping with difficulties and turning them into an advantage to improve the current situation (Kantur & Say, 2015). Organizations are faced with a wide range of negative situations ranging from economic crises to natural disasters at all stages of their lives (Özdemir, 2020). In 2007, Economist Intelligence Unit published a report named “Business Resilience: Ensuring Continuity in a Changing Environment” which expresses the adverse events faced by organizations. These adverse events are given below:

**Table 1. Negative Situations Faced by Organizations**




**Source:** EIU,2017

The characteristics of organizational resilience are as following (Xiao & Cao, 2017):

1) Resilience emerges in unexpected crisis situations in the internal and external environment. Although organizational resilience is a potential capacity for organizations, it is not included in the business activities of organizations. But when the environment becomes disruptive and urgent, organizational resilience can be an advantage for organizations.
2) Surviving, adapting, and thriving in a disruptive situation are all about organizational resilience. Organizational resilience is the ability to recover from destruction, not resistance to an unexpected event. Organizations with high flexibility can adapt to new situations in a timely manner and increase their organizational resilience levels when faced with a variety of dramatic changes.
3) As a multidimensional concept, organizational resilience relates to organizational resources, processes, and routines. Meanwhile, resilience is a process influenced by the organization's resources and routines.

In today's world where uncertainty and variables are very intense, organizations need to develop a resilience capacity that enables them to cope with unexpected events quickly and effectively, to successfully get out of crisis situations, and even to encourage future success (Duchek, 2020). Schools, like other organizations, are very susceptible to changes and other

unexpected situations and this causes the development of resilience capacities of schools to come to the fore as an important issue (Limon & Sezgin-Nartgün, 2020).

At the "Regional Consultative Meeting on Education and Resilience" sponsored by UNICEF and UNESCO, experts proposed nine priority ways to make schools more resilient to conflicts and crises (UNICEF, 2015). These are:

- Analyzing conflict and crisis risks,
- Include conflict and disaster risk reduction in the planning and budgeting process of the education sectors,
- Creating a school safety framework within planning,
- Adoption of curricula and textbooks for social cohesion and school safety,
- Ensure fair and secure access to education for all,
- Monitoring and evaluating the progress of initiatives to reduce risks,
- Promote coordination and networks,
- To create a stronger educational administration and to encourage local participation,
- Capacity building for risk reduction,

**Dimensions of Organizational Resilience**

Based on the studies of Mallak (1998) and Tierney (2003), Kantur & Say (2015) conducted scale development studies in order to measure organizational resilience and organizational resilience and they created a three-dimensional structure, namely robustness, agility and integrity.

Robustness is a dimension that measures organizational capacity to resist and overcome undesirable situations (Kantur & Say, 2015). In general, robustness can be defined as "the ability to withstand or survive external shocks in order to remain stable despite uncertainty" (Banes, 2010). Robustness has also been defined as "the ability of a system to withstand deterioration in structure without change in function" (Jen, 2003). Robust organizations have the ability to maintain their distinctive attributes under changing conditions (Oss & Hek, 2011). They can regulate, organize and renew themselves by fulfilling their vital functions despite structural or environmental changes and conflicting demands (Riese, 2005). Organizational resilience is not fundamentally designed, but can emerge and institutionalize through the shaping of internal routines, culture and memory (Capano & Woo, 2018).

Agility is the dimension that measures organizational capacity that enables to take action quickly in the face of undesirable situations (Kumbalı, 2018). Organizational agility is the capability of organizations to respond to unpredictable opportunities quickly and effectively, as well as to provide in advance solutions that meet potential needs (Nelson & Harvey, 1995). The concept of agility is essentially related to speed and flexibility. But being quick or flexible is not enough to be agile. It is necessary for organizations to consider the purpose, benefit and time factors in order to be agile. For this reason, organizations should not only react quickly, but also go in the right direction, stop and change direction quickly (İşcan & Karabey, 2006).

Integrity is the dimension that measures the commitment among employees when faced with undesirable and unexpected situations. With this dimension, it is expressed that employees are able to act as a whole together with all their units and members in the face of unexpected or critical situations (Kantur & Say, 2015; Öztürk, 2018). The concept of integrity is an important element for being a team and perceiving problems in a coordinated way, evaluating possible crisis situations and reaching a solution (Öztürk, 2018). Integrity requires that all organizational members internalize the same values and principles, act according to a common culture, develop close relations with all stakeholders, mutual loyalty, cooperation and teamwork (Verhezen, 2010; Hsu, 2007, cited in Kumbalı, 2018).

## METHOD

This part of the research includes the research model, population and sample, data collection tools and data analysis.

**Model of the Research**

Relational screening model was used in this study. The relational screening model can be defined as a screening approach that aims to determine the existence of co-variation between two or more variables. In the relational screening model, it is aimed to determine whether the variables change together and how it happened if there is a change (Karasar, 2014).

**Population and Sample of the Research**

The population of the research consists of teachers working in public and private secondary education institutions located within the borders of Kastamonu province. The table regarding the universe of the research is given below:

**Table2. Population of the Research**

| Secondary Education (General) | | | | Secondary Education (Vocational and Technical) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Male** | **%** | **Female** | **%** | **Male** | **%** | **Female** | **%** | **Total** | **%** |
| 296 | 18 | 245 | 15 | 591 | 35 | 544 | 32 | 1676 | 100 |

Sampling was taken from the research population with proportional stratified sampling in order to ensure that each subgroup within the population receives proper representation within the sample. In addition, stratified random sampling provides better coverage of the population (Büyüköztürk et al., 2009). While determining the number of samples, the "Table of Sample Amount to be Drawn from a Certain Population" developed by Robert V. Krejcie and Daryle W. Morgan (1970, p. 608) was used. The sample of the study (95% confidence interval, 5% margin of error) consisted of 313 teachers working in secondary education institutions. Due to the pandemic, the research data was obtained using the "Google Forms" application. 320 teachers filled out the questionnaire, 7 teachers' questionnaires were not included in the analysis because they were filled incompletely. A total of 313 teachers' data was analyzed. Demographic findings of 313 teachers participating in the study were shown in Table 3.

**Table3. Sample Demographic Background**

| Demographics | Frequency (f) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 166 | 53 |
| Female | 147 | 47 |
| **Total** | **313** | **100** |
| **Teaching Experience** | | |
| 1 – 5 Years | 30 | 9,58 |
| 6 – 10 Years | 56 | 17,89 |
| 11 – 15 Years | 44 | 14,06 |
| 16 – 20 Years | 62 | 19,81 |
| 21 Years and over | 121 | 38,66 |
| **Total** | **313** | **100** |
| **School Type** | | |
| Anatolian High School | 83 | 26,52 |
| Vocational and Technical Anatolian High School | 99 | 31,63 |
| Science High School | 7 | 2,24 |
| Fine Arts High School | 19 | 6,07 |
| Social Sciences High School | 8 | 2,56 |
| Anatolian Imam Hatip High School | 92 | 29,38 |
| Basic High School | 5 | 1,60 |
| **Total** | **313** | **313** |

When Table 3 is examined, it is seen that approximately 3/2 of the teachers included in the sample are teachers working in vocational and technical education institutions due to the high number of teachers working in vocational and technical education institutions. The distribution of teachers participating in the research by gender can be considered balanced. Besides, it is seen that the majority of the teachers participating in the research have a professional seniority of 16 years or more and the majority of the teachers participating in the research work in Anatolian High Schools, Vocational and Technical Anatolian High Schools and Anatolian Imam Hatip High Schools. Few teachers working in Basic High School, Science High School and Social Sciences High Schools participated in the research.

**Data Collection Tools**

In the study, two different measurement tools were used. In order to measure the level of organizational change fatigue of teachers, "Organizational Change Fatigue Scale", which was developed by Bernerth, J.B., Walker, H.J., and Harris, S. G. in 2011 and adapted into Turkish by Limon in 2020 was used. In order to measure the organizational resilience level of secondary education institutions, the "Organizational Resilience Scale" developed by Kantur and Say in 2015 was used. The Organizational Change Fatigue scale consists of 6 items. The Organizational Resilience Scale, on the other hand, consists of 9 items and three dimensions: robustness, integrity and agility. Confirmatory factor analysis (CFA) was conducted for both scales. For organizational change fatigue scale, comparative fit index (CFI) is .99, normed fit index (NFI) is .96, and the root mean square error of approximation (RMSEA) is .5 (Limon, 2020). For organizational resilience scale, comparative fit index (CFI) is .95, normed

fit index (NFI) is .92, and the root mean square error of approximation (RMSEA) is .8 (Kantur & Say, 2015). When the fit values given for both scales are examined, it is seen that the single-factor structure of the 6-item organizational change fatigue scale and the 3-factor structure of the 9-item organizational resilience scale generally have good fit values and are confirmed.

The Cronbach alpha value of the Organizational Change Fatigue Scale was found to be .86 by Limon (2020). The Cronbach alpha value of the Organizational Resilience Scale was found to be .85 by Kantur and Say. In this study, the Cronbach alpha value for the Organizational Change Fatigue scale was found to be .83 and the Cronbach alpha value for the organizational resilience scale was found to be .94. According to these results, we can say that both scales have high reliability values.

For both scales, application permission was obtained firstly from Gazi University Ethics Committee and then from Kastamonu Provincial Directorate of National Education.

**Data Collection and Analysis**

Due to the pandemic conditions, the data was obtained using the "Google Forms" application and recorded in the SPSS 22 program. While the information about the teachers was expressed by calculating frequency (f) and percentage (%), Pearson Product-Moment Correlation Coefficient analysis was used to reveal whether there was a relationship between the variables and multiple regression analysis technique was used to reveal whether the variables predicted each other. Results were tested at $p < .01$ and $p < .05$.

In order to transform the averages of organizational change fatigue and organizational resilience scales into verbal expression, the average range (5-1=4, 4/5=0.80) was calculated and the comments were made based on this calculation. Numerical limits for organizational change fatigue and organizational resilience scale are as following: 1.00 – 1.80 “strongly disagree”, 1.81 – 2.60 “disagree”, 2.61 – 3.40 “undecided”, 3.41 –4.20 “agree”, and 4.21 – 5.00 “strongly agree”.

The coefficient ranges used in the interpretation of the correlation coefficients that emerged at the end of the research are as follows: The correlation coefficient between 0.00 and 0.29 indicates a positive and low relationship, the correlation coefficient between 0.00 and -0.29 indicates a negative and low relationship, the correlation coefficient between 0.30 and 0.69 indicates a positive and moderate correlation, the correlation coefficient between -0.30 and -0.69 indicates a negative and moderate correlation, the correlation coefficient between 0.70 and 1.00 indicates a positive and high relationship and the correlation coefficient between -0.70 and -1.00 indicate a negative and high relationship (Büyüköztürk et al., 2009, p. 92).

Before the analysis of the data, the skewness coefficients of the scores given to the teachers working in secondary education institutions were examined to determine whether the scores given to the organizational change fatigue and organizational resilience scales show a normal distribution. In the table below, the skewness coefficients of the scores given by the teachers to both scale items are given:

**Table 4. Organizational Change Fatigue Scale Skewness Coefficient**

| | **N** | **Arithmetic Mean** | | **Standard Deviation** | **Skewness** | |
|---|---|---|---|---|---|---|
| | Statistics | Statistics | Standard error | Statistics | Statistics | Standard error |
| **Organizational Change Fatigue** | 313 | 4,1847 | ,04300 | ,67850 | -,888 | ,154 |
| **Valid N** | 313 | | | | | |
| | **N** | **Arithmetic Mean** | | **Standard Deviation** | **Skewness** | |
| | Statistics | Statistics | Standard error | Statistics | Statistics | Standard error |
| **Organizational Resilience** | 313 | 3,7104 | ,05583 | ,687210 | -,508 | ,156 |
| **Valid N** | 313 | | | | | |

Considering the skewness of the scores of the teachers from the organizational change fatigue scale and organizational resilience scale, it can be said that the score distributions show a normal distribution. The skewness coefficient of the scores obtained from the organizational change fatigue scale is -,888 and the skewness coefficient of the scores obtained from the organizational resilience scale is -,508 and they are between +/-1 (Büyüköztürk et al., 2009, p. 63). In the light of this result, parametric tests including independent sample t-test, one-way Anova, Pearson Product Moments Correlation Coefficient and regression analysis were applied during the analysis of the data.

## FINDINGS

In this section, the findings that emerged as a result of the analysis of the data obtained with the data collection tools for each sub-problem were interpreted after being given with tables and figures.

**Findings Related to the First Sub-Problem**

The organizational change fatigue level of teachers working in secondary education institutions is given in Table 5.

**Table 5. Organizational Change Fatigue Levels of Teachers**

| Items | N | $\bar{X}$ | Ss |
|---|---|---|---|
| **1.** Too many change initiatives are being initiated in our education system | 313 | 4,20 | ,87841 |
| **2.** I am tired of all these changes in our education system. | 313 | 3,97 | 1,03515 |
| **3.** There is a very intense process of change in our education system. | 313 | 4,16 | ,95650 |
| **4.** As teachers, we are asked to change so many things. | 313 | 4,14 | ,90714 |
| **5.** As teachers, I constantly feel like we are being asked to change something. | 313 | 4,03 | 1,06207 |
| **6.** I would like to see a stable process in our education system before any other | 313 | 4,61 | ,68682 |
| **Full Scale** | **313** | **4,18** | **,67850** |

Table 5 shows the arithmetic averages and standard deviations of the answers given by the teachers working in secondary education institutions to the items in the organizational change fatigue scale. The arithmetic mean of the entire scale is $\bar{x}$= 4.18. According to this finding, we can say that teachers working in secondary education institutions participating in the research experience organizational change fatigue at the level of "agree". In other words, teachers think that too many change initiatives are initiated at the same time. The 6th item got the highest score in the scale. Accordingly, the teachers expressed that they wanted to see a stable process before making a change in the Turkish Education System at the level of "strongly agree". Item 2 received the lowest score in the scale. According to this finding, teachers stated that they were fed up with all the changes in our education system at the level of "agree".

**Findings Regarding the Second Sub-Problem**

In order to find out whether the organizational change fatigue levels of teachers working in secondary education institutions change significantly according to the gender variable, the independent sample t-test, which is a parametric test, was applied. The findings regarding the gender variable are given in Table 6:

**Table 6. Findings on the Relationship Between Change Fatigue Levels of Teachers and Their Gender**

| | Gender | *n* | $\bar{X}$ | *Ss* | *t* | *p* |
|---|---|---|---|---|---|---|
| **Change Fatigue** | Female | 147 | 4,24 | ,63844 | 1,223 | ,223 |
| | Male | 166 | 4,13 | ,71653 | | |

According to the independent sample t-test results given in Table 6., organizational change fatigue levels of teachers working in secondary education institutions do not show a significant difference according to the gender variable. In other words, female and male teachers experience similar levels of change fatigue. In the analysis, $p > 0.05$ was found.

One-way analysis of variance (Anova) was conducted to reveal whether the organizational change fatigue levels of teachers differ significantly according to their professional seniority. The results of the independent sample one-way analysis of variance are given in Table 7:

**Table 7. One-Way Analysis of Variance (Anova) Results on Change Fatigue Levels of Teachers According to the Variable of Professional Seniority**

| | Sum of Squares | df | Average of Squares | F | Sig. |
|---|---|---|---|---|---|
| **Between groups** | 2,005 | 4 | ,501 | 1,091 | ,362 |
| **Within groups** | 112,164 | 244 | ,460 | | |
| **Total** | 114,169 | 248 | | | |

According to the results of the one-way analysis of variance given in Table 7, organizational change fatigue levels of teachers working in secondary education institutions do not show a significant difference according to the variable of professional seniority. In the analysis, $p > 0.05$ was found.

One-way analysis of variance was conducted to reveal whether the organizational change fatigue levels of teachers differ significantly according to the type of institution they work in. The results of the independent sample one-way analysis of variance are given in Table 8.

**Table 8. One-Way Analysis of Variance Results on Change Fatigue Levels of Teachers by School Type Variable**

| | Sum of Squares | df | Average of Squares | F | Sig. |
|---|---|---|---|---|---|
| **Between groups** | 11,101 | 6 | 1,850 | 4,344 | ,000 |
| **Within groups** | 103,067 | 242 | ,426 | | |
| **Total** | 114,169 | 248 | | | |

According to the results of the one-way analysis of variance given in Table 8., organizational change fatigue levels of teachers working in secondary education institutions show a significant difference according to the type of institution they work in. In the analysis, $p < 0.05$ was found. Since the data showed a homogeneous distribution, the tukey test was applied to find the difference between the groups. Tukey test results are given in Table 9.

**Table 9. Tukey Test Results on Change Fatigue Levels of Teachers by School Type Variable**

| (I) institution | (J) institution | Difference of Means (I-J) | Standard Error | Sig. |
|---|---|---|---|---|
| **Fine Arts High School** | Anatolian High School | **-,82804*** | ,20940 | **,002** |
| | Vocational and Technical Anatolian High School | **-,99242*** | ,21253 | **,000** |
| | Social Sciences High School | **-,99621*** | ,30324 | **,020** |
| | Anatolian Imam Hatip High School | **-,75889*** | ,21187 | **,007** |

*The mean difference is significant at the 0.05 significance level (statistically insignificant results are not included in the table).

When Table 9 is examined, we can state that teachers working in Fine Arts High Schools ($\bar{x}$=3.38) experience statistically significantly less organizational change fatigue than teachers working in Anatolian High Schools ($\bar{x}$=4.21), Social Sciences High Schools ($\bar{x}$=4.38), Anatolian Imam Hatip High Schools ($\bar{x}$=4.14) and Vocational and Technical Anatolian High Schools ($\bar{x}$=4.37). According to this result, it is possible to say that teachers working in Fine Arts High School experience less stress and are less overwhelmed by the change initiatives.

**Findings Regarding the Third Sub-Problem**

According to the opinions of the teachers participating in the research, the organizational resilience levels of secondary education institutions are given in Table 10:

**Table 10. Organizational Resilience Levels of Secondary Education Institutions**

| Items | N | $\bar{X}$ | Ss |
|---|---|---|---|
| stands straight and preserves its position. | 313 | 3,74 | 1,03872 |
| is successful in generating diverse solutions. | 313 | 3,88 | ,96642 |
| shows resistance to the end in order not to lose. | 313 | 3,57 | 1,10511 |
| does not give up and continues its path. | 313 | 3,77 | 1,01697 |
| **ROBUSTNESS** | **313** | **3,74** | **,89351** |
| rapidly takes action. | 313 | 3,80 | 1,02538 |
| develops alternatives in order to benefit from negative circumstances. | 313 | 3,69 | ,99758 |
| is agile in taking required action when needed. | 313 | 3,76 | 1,03476 |
| **AGILITY** | **313** | **3,75** | **,93470** |
| is a place where all the employees engaged to do what is required from them. | 313 | 3,65 | 1,10716 |
| is successful in acting as a whole with all of its employees. | 313 | 3,62 | 1,08618 |
| **INTEGRITY** | **313** | **3,63** | **1,05960** |
| **Full Scale** | **313** | **3,71** | **0,87210** |

Table 10 shows the arithmetic averages and standard deviations of the answers given by the teachers working in secondary education institutions to the items in the organizational resilience scale. The arithmetic mean of the entire scale is $\bar{x}$= 3.71. According to this finding, we can say that the teachers working in the secondary education institutions participating in the research find the secondary education institutions they work to be durable at the level of "agree". In other words, according to

the opinions of teachers, secondary education institutions can react immediately in unexpected crisis situations, successfully get out of the crisis situation, adapt quickly to new situations and continue their development. It is extremely important for the Turkish Education System that our secondary education institutions are resilient, especially despite the negativities and uncertainties brought by the pandemic period. When the sub-dimensions of the scale are examined, similar results are seen. The average score of secondary education institutions from the robustness dimension $\bar{x}$ = 3.74; the mean score they got from the agility dimension is $\bar{x}$ = 3.75 and the mean score they got from the integrity dimension is $\bar{x}$ = 3.63. The average score given by the teachers to the statements in all three dimensions is at the level of "agree". In other words, teachers working in secondary education institutions have stated that they have managed to survive in a stable manner despite uncertainty and external shocks, they have responded quickly and effectively to unexpected situations and all employees have bonded and acted together in unexpected situations.

**Findings Related to the Fourth Sub-Problem**

According to this result, one-way analysis of variance (Anova) technique, which is a parametric test, was used to reveal whether the organizational resilience level of secondary education institutions changes significantly according to school type variable. The findings regarding the school type variable are given in Table 11:

**Table 11. One-Way Analysis of Variance Results on Organizational Resilience Levels of Secondary Education Institutions by School Type Variable**

| | Sum of Squares | df | Average of Squares | F | Sig. |
|---|---|---|---|---|---|
| **Between groups** | 14,882 | 6 | 2,480 | 3,459 | ,003 |
| **Within groups** | 169,936 | 244 | ,717 | | |
| **Total** | 184,818 | 248 | | | |

According to the results of the one-way analysis of variance given in Table 15, organizational resilience levels of secondary education institutions show a significant difference according to the school type variable. In the analysis, $p < 0.05$ was found. Since the data showed a homogeneous distribution, the tukey test was applied to find the difference between the groups. Tukey test results are given in Table 12.

**Table 12. Tukey Test Results on Resilience Levels of Secondary Education Institutions by School Type Variable**

| (I) institution | (J) institution | Difference of Means (I-J) | Standard Error | Sig. |
|---|---|---|---|---|
| **Vocational and Technical Anatolian High School** | Anatolian Imam Hatip High School | **-,47352*** | ,14685 | **,024** |

*The mean difference is significant at the 0.05 significance level (Statistically insignificant results are not included in the table).

When Table 12. is examined, it is concluded that teachers working in Vocational and Technical Anatolian High Schools ($\bar{x}$=3.39) find the institutions they work for less resilient than teachers working in Anatolian Imam Hatip High Schools ($\bar{x}$=3.86). In other words, teachers working in Vocational and Technical Anatolian High Schools think that the institutions they work for react more slowly in unexpected situations than other types of schools, especially Anatolian Imam Hatip High Schools, and that they come out of these negative situations with less success. According to the results of the one-way analysis of variance regarding the sub-dimensions of the organizational resilience scale, it was observed that there were significant differences between the groups in the agility and robustness dimensions. In the dimension of integrity, there was no difference between the groups. There was a statistically significant difference between Vocational and Technical Anatolian High Schools and Anatolian Imam Hatip High Schools in terms of robustness. According to teachers' opinions, Vocational and Technical Anatolian High Schools are less robust than Anatolian Imam Hatip High Schools. When we come to the agility dimension, Science High Schools ($\bar{x}$=4.62) act more agile in crisis situations compared to Vocational and Technical Anatolian High Schools ($\bar{x}$=3.39) and Anatolian Imam Hatip High Schools ($\bar{x}$=3.86).

**Findings Related to the Fifth Sub-Problem**

Pearson Product Moments Correlation Coefficient *(r)*, a parametric test, was used to analyze whether there is a significant relationship between organizational change fatigue levels of teachers working in secondary education institutions and organizational resilience levels of these institutions.

**Table 13. The Relationship Between Organizational Change Fatigue Levels of Teachers Working in Secondary Education Institutions and Organizational Resilience Levels of Secondary Education Institutions**

| | | Robustness | Agility | Integrity | Organizational Resilience Total |
|---|---|---|---|---|---|
| **Organizational Change Fatigue** | Pearson Correlation | -,060 | ,004 | ,004 | -,025 |
| | Sig. (2-two tailed) | ,352 | ,948 | ,953 | ,700 |
| | **n** | **313** | **313** | **313** | **313** |

When we examine Table 13, it is seen that there is no significant relationship between the organizational change fatigue levels of teachers and the organizational resilience levels of secondary education institutions. In the analysis, $p > 0.05$ was found. In other words, the decrease or increase in teachers' organizational change fatigue levels does not affect the organizational resilience levels of secondary education institutions in a statistically significant way.

**Findings Related to the Sixth Sub-Problem**

Regression analysis was conducted to reveal whether the organizational change fatigue levels of teachers working in secondary education institutions are a significant predictor of organizational resilience level of secondary education institutions. Regression analysis results are given in Table 14:

**Table 14. Simple Regression Analysis Results on Predicting Organizational Resilience by Organizational Change Fatigue Level**

| Variable | B | Standard Error | β | t | p |
|---|---|---|---|---|---|
| **Constant** | 4,114 | ,357 | | 11,523 | ,000 |
| **Organizational Change Fatigue** | -,090 | ,084 | -,068 | -1,069 | ,286 |
| **R=0,68** | **$R^2$=0,01** | | | | |
| **F=.149** | **p=.700** | | | | |

When the correlation values between the predictive variable organizational change fatigue level and the organizational resilience levels of secondary education institutions are examined, it is seen that there is no significant relationship between organizational change fatigue and organizational resilience ($r=0.68$, $p>0.05$). According to the results of the analysis, organizational change fatigue levels of teachers are not a significant predictor of organizational resilience levels of secondary education institutions.

## DISCUSSION, CONCLUSION AND RECOMMENDATIONS

As a result of this research, it has been revealed that teachers working in secondary education institutions experience organizational change fatigue at the level of "agree". Participants state that an extreme change initiative has been started in the Turkish Education System and this change process makes them feel overwhelmed and stressed. Majority of the teachers participating in the research emphasize that they want to see a stable process before a change initiative is started. This result is consistent with the research results of Limon and Sezgin-Nartgün (2020). In their study on 1935 teachers, Limon and Sezgin-Nartgün concluded that teachers experience change fatigue at the level of "agree". The fact that an extreme change initiative has been started in the Turkish Education System also coincides with the results of other studies in the literature. In the relevant studies, Can (2014) stated that the education system has been changed constantly and in an unplanned way; Doğutaş (2016) stated that because changes are made in the system frequently, teachers cannot follow the changes, they falter, and teachers are not included in the decision-making process while making changes; Güven and Güven (2019) stated that the most important problem of the Turkish Education System is the frequent system changes; Yeşil and Şahan (2016) revealed that short-term and frequent changes cause some disturbances and incompatibilities between system components. As can be seen, many researchers have stated that unplanned changes are frequently made in our education system. As an inevitable consequence of these extreme change efforts, teachers experience high levels of organizational change fatigue. This situation is likely to have negative consequences for our education system. Teachers' experience of change fatigue can reduce their motivation, decrease organizational effectiveness, commitment, job satisfaction and increase staff circulation, cause burnout and intense stress (Arık et al. 2022; Brown et al. 2018; Ead, 2015; Bernerth et al., 2011). For this reason, taking the opinions of all stakeholders, especially teachers and school administrators, before making a change in the education system, trying to improve existing practices instead of making constant changes, preparing education policies based on data and planning well, and adopting a supra-political education approach will contribute to the solution of the problem.

The research has revealed that teachers' organizational change fatigue levels did not change significantly according to gender and seniority variable, but showed a significant change according to school type variable. This result is also consistent with the research results of Limon and Sezgin-Nartgün (2020). Although not statistically significant, female teachers experience more change fatigue than male teachers. Teachers working in Fine Arts High School experience statistically significantly less change fatigue than teachers working in other school types. This may be due to the fact that Fine Arts High School is not an academic high school. Since students will take aptitude tests for higher education, academic success anxiety is less. Therefore, changes in the examination system, changes in assessment and evaluation practices, and changes in the curriculum may cause less anxiety and stress for teachers.

When we come to the organizational resilience levels of secondary education institutions, the teachers stated that the secondary education institutions they work for are resilient at the level of "agree". This result is also consistent with the results of the research conducted by Limon, Dilekçi, and Demirer (2021). In the research examining the mediating role of the initiative climate in the relationship between distributed leadership and organizational resilience in schools, it was found that schools were resilient at the "agree" level ($\bar{x}$= 3.72). Organizational resilience is very important for today's organizations in order to gain competitive advantage by getting stronger from sudden and rapidly developing and uncertain crisis situations. Since educational organizations operate in a rapidly changing environment, they frequently encounter unexpected crisis situations (Limon et al., 2021). Therefore, this result is extremely important in terms of showing that our schools have a high level of organizational resilience and that they have successfully emerged from crisis situations. In addition, It is a positive development that educational institutions are accepted as “resilient” especially during the pandemic period when uncertainties are very intense. While teachers' change fatigue is a threat for our education system, the resilience of our educational institutions can be considered an opportunity. According to teachers' opinions, our educational institutions are minimally affected by changing environmental conditions and crisis environments, and they can easily adapt to new situations. The teachers that participated in the research gave points at the level of "agree" in the dimensions of robustness, integrity and agility. According to teachers, educational institutions can produce different solutions in crisis situations such as pandemics, act quickly and act as a whole with all their employees. When we evaluate the Covid19 epidemic period, we have seen that teachers and school administrators have really worked in harmony, they have acted together to minimize the learning losses of students, they have turned their homes into a classroom environment, they have paid a fee to buy various programs, computers and technological tools such as graphic tablets in order to start online classes with students immediately.

Finally, the results of the study revealed that there is no significant relationship between the organizational change fatigue levels of teachers and the organizational resilience levels of secondary education institutions. In other words, teachers' change fatigue does not significantly affect organizational resilience, either positively or negatively. There could be many factors that cause this result. First of all, in the studies conducted in the literature, it is seen that teachers' resistance to change is at a moderate level and even close to the level of "I disagree". In a study conducted by Çalık et al. in 2013, it was revealed that primary school teachers showed resistance to change at a moderate level ($\bar{x}$ = 2.69 / I partially agree). The study conducted by Çelik (2009) on 498 preschool and primary school teachers also revealed that teachers show resistance to change at a moderate level ($\bar{x}$ = 2.61 / I partially agree). In the study conducted by Canaslan (2022), the change agility levels of teachers working in secondary education institutions were found as $\bar{x}$ = 3.71 (many times). Educational institutions need to quickly adapt to changing situations in order to increase their organizational resilience capacity. The results of these three studies show that although teachers experience a high level of change fatigue, they do not show much resistance to change and adapt quickly to change and easily cope with the uneasiness created by change. In short, although teachers experience a high level of change fatigue, their resistance to change is low or moderate, and they accept change quickly and adapt quickly to change. For this reason, teachers' high change fatigue may not adversely affect the organizational resilience of educational institutions, contrary to expectations. In another study supporting this possibility, teachers' readiness for change was found to be $\bar{x}$ = 3.70 (Çayak & Erol, 2022). In line with this research finding, it is possible to say that although teachers experience change fatigue, they are ready for change at a very high level, they welcome change initiatives and think that change is necessary. In this study, it was also concluded that teachers' change fatigue levels were not a significant predictor of organizational resilience levels of secondary education institutions. This result shows that teachers' change fatigue levels do not have an important explanatory role in the variance in organizational resilience scores of secondary education institutions. For this reason, investigating the relationship between organizational culture, organizational commitment, organizational citizenship, leadership, organizational learning, psychological resilience, organizational trust and teachers' resilience levels, which are likely to be predictors of organizational resilience, will fill the gap in the literature regarding the organizational resilience variable.

1- In the Turkish Education System, instead of launching simultaneous change initiatives, it is necessary to prioritize change initiatives for the education system and teachers, and these initiatives should be implemented sequentially to reduce teachers' change fatigue level.
2- Instead of radical changes in the Turkish Education System, the failing aspects of the current system should be improved. In addition, before any change initiative is initiated, taking the opinions of all stakeholders who will be

affected by the change will enable healthier decision-making, enable teachers to accept change faster and experience less organizational change fatigue.

3- School administrators need to prepare effective crisis management and strategic plans in order to increase organizational resilience and to emerge stronger from unexpected crisis situations such as the Covid 19 pandemic that we have experienced in recent years.

4- In future studies, the effects of school administrators' leadership styles, communication skills, crisis management skills, conflict management styles and teachers' organizational commitment and organizational citizenship levels on organizational resilience can be examined.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.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## Statements of publication ethics

I/We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

## Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

## Ethics Committee Approval Information

The research proposal titled "Examination of the Relationship Between the Organizational Change Fatigue of Teachers and the Organizational Resilience Levels of Secondary Education Institutions" was discussed by the Gazi University Ethics Committee Commission at the meeting dated 06.04.2021 and numbered 06 and was unanimously approved. The approval code for the study is 2021-460.

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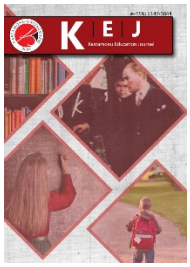

| Research Article / Araştırma Makalesi |

# Mapping the Research on Educational Technology: An Overview through Text Mining

# Eğitim Teknolojisi Araştırmalarının Haritalandırılması: Metin Madenciliği İle Genel Bir Bakış

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**Keywords**

1. Educational technology
2. Instructional technology
3. Instructional design
4. Research trends
5. Text mining

**Anahtar kelimeler**

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## Abstract

*Purpose:* In this study, it is aimed to determine the trends of studies in the field of educational technologies with the text mining method.

*Design/Methodology/Approach:* In study, 10,218 studies published since 2000 by the top ten journals in the "Educational Technology" sub-category in Google Scholar Metrics were analyzed by text mining.

*Findings:* Although it showed that the number of articles in the clusters increased daily, the rate of increase was higher in some clusters than in others. It has been seen that the most studied theories in the field of educational technologies are Cognitive Load Theory and Technology Acceptance Model. When examined in terms of variables, it is seen that the variables of Motivation, Success, Commitment and Social Presence find their place in educational technology studies.

*Highlights:* It has been determined that the studies in the field of Educational Technologies include articles in 20 thematic clusters in seven main categories. It is possible to collect clusters under seven headings: Assessment, Language Learning, Instructional Design, Technology in Learning Environments, Theoretical Foundations, Computational Thinking and Online Learning. While it is foreseen that some of these issues will be discussed again, especially after the pandemic, some studies are thought to be needed more. In addition, the field of educational technology is seen as an interdisciplinary field, as stated before. For this reason, it is known that more subject areas are related to the clusters created here. Different perspectives can be revealed by using different methods in similar data sets.

## Öz

*Çalışmanın amacı:* Bu çalışmada, metin madenciliği yöntemi ile eğitim teknolojileri alanındaki çalışmaların eğilimlerini belirlemek amaçlanmıştır.

*Materyal ve Yöntem: Araştıramda,* Google Scholar Metrics'te "Eğitim Teknolojisi" alt kategorisinde ilk on derginin 2000 yılından bu yana yayınladığı 10.218 çalışma metin madenceliği ile incelenmiştir.

*Bulgular:* Kümelerdeki makale sayısının günlük olarak arttığını gösterse de, artış hızı bazı kümelerde diğerlerine göre daha yüksekti. Eğitim teknolojileri alanında en çok çalışılan teorilerin Bilişsel Yük Teorisi ve Teknoloji Kabul Modeli olduğu görülmüştür. Değişkenler açısından incelendiğinde Motivasyon, Başarı, Bağlılık ve Sosyal Varlık değişkenlerinin eğitim teknolojisi çalışmalarında kendine yer bulduğu görülmektedir.

*Önemli Vurgular:* Eğitim Teknolojileri alanında yapılan çalışmaların yedi ana kategoride 20 tematik kümede makaleler içerdiği tespit edilmiştir. Kümeleri yedi başlık altında toplamak mümkündür; Değerlendirme, Dil Öğrenme, Öğretim Tasarımı, Öğrenme Ortamlarında Teknoloji, Teorik Temeller, Hesaplamalı Düşünme ve Çevrimiçi Öğrenme. Bu konulardan bazılarının özellikle pandemi sonrası tekrar ele alınacağı ön görülürken bazı çalışmalara ise daha fazla ihtiyaç olduğu düşünülmektedir. Ayrıca eğitim teknolojisi alanı daha önce de belirtildiği gibi disiplinler arası bir alan olarak görülmektedir. Bu nedenle daha çok konu alanının burada oluşturulan kümelerle ilgili olduğu bilinmektedir. Benzer veri setlerinde farklı yöntemler kullanılarak farklı bakış açıları ortaya çıkarılabilir.

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## INTRODUCTION

The studies so far in the field of educational technologies are shaped by important technological changes such as the internet and the subjects studied are evolving from instructional design to learning environments (Mihalca, & Miclea, 2007). Therefore, definitions made in the field of educational technology from past to present have also changed (Ely, 1963; AECT, 1972; AECT, 1977; Seels, & Richey, 1994; Spector, 2015).Considering the historical development of educational technology definitions, the definitions in the field are expressed as instructional design, educational technology, and instructional technology, with an emphasis on process and design (Reiser, 2007; Januszewski & Persichitte, 2008). In addition, under the different definitions, there are developments in technology, developments in psychology and criticisms made towards the field of instructional technologies (Reiser, 2007). While the first definitions of Educational Technology emphasized audio-visual technologies (Ely, 1963), it was later noted that Educational Technology, as a process intended to increase learning and achievement, is more complex and multi-faceted (AECT, 1977; Seels & Richey, 1994; AECT, 2008). Educational Technology does not simply involve using various forms of technology as tools, but should also be understood as the systematic organization of all resources and processes. Another definition made by Spector (2015), which is close to today, is the meaningful use and application of relevant information to strengthen the learning and teaching processes of educational technology. When these definitions are examined, it is seen that the definitions have changed over time with the developing technology and even new concepts have emerged.

Educational technology aims to increase learning and performance in different learning areas. As such, it is an interdisciplinary field (Wilson, 2012; Bodily, Leary, & West, 2019). For this reason, Educational Technology can be defined as a field that communicates and interacts with different disciplines and aims to facilitate learning (Liu, Meng & Chen, 2020; Luckin & Cukurova, 2019). Today, the rapid spread of information and the fact that individuals often want to be able to learn without being connected to a particular institution or a person have increased the importance of Educational Technology.

It is crucial for researchers who study or who are beginning to study educational technology to define the field and the place of their studies within it. However, researchers may have difficulty in defining Educational Technology (Bodily, Leary, & West, 2019). It thus becomes necessary to develop an overview of where things stand and to determine the trends occurring within the field in order to eliminate this difficulty.

The various studies conducted for this purpose have generally used the content analysis method (e.g. Gülbahar & Alper, 2009; Kucuk, Aydemir, Yildirim, Arpacik, & Goktas, 2013), conducted analyses of selected journals (e.g., Alper & Gülbahar, 2009; Bodily, Leary, & West, 2019; Hsu et al., 2012; Hsu, Hung, & Ching, 2013), or focused on one of the subject areas within Educational Technology (e.g., Hwang& Tsai, 2011; Wu, 2013). Although many studies have been carried out in the field of educational technologies, the trends revealed by the time periods of trend studies and the journals they have examined vary as well as the definitions of educational technologies. (Klein, 1997; Bozkaya, Aydin, & Kumtepe, 2012; Ross, Morrison, & Lowther, 2010; Alper, & Gülbahar 2009).

### Related Reviews

In the study conducted by Martin, Diaz, Sancristobal, Gil, Castro, & Peire (2011) between 2004 and 2014 with bibliometric method, ideas about which technologies will be more efficient and effective in the field of educational technology were presented. As a different subject from other studies, the subject of augmented reality has been mentioned for future studies. According to this study, it was stated that research topics that should be focused in the future will become more useful and accurate with such trend studies.

In the study conducted by Kucuk, Aydemir, Yildirim, Arpacik, & Goktas (2013), a total of 1151 articles, including journals indexed in SSCI, SCI and ERIC, were examined between 1990-2011. According to this study, it was observed that the studies carried out in the field of educational technologies between 2002-2007 increased even more. In the study, which was conducted using educational technology classification forms and other data collection tools, the subjects were mainly observed in education technology, multimedia, distance education and educational environments. In addition, at the end of the study, it is stated that conducting such studies at certain time intervals is important in terms of following the current trends in the field and giving an idea to future studies.

In the study conducted by Baydas, Kucuk, Yilmaz, Aydemir, & Goktas (2015), it was found that learning approaches and learning environments research were mainly studied in 1255 articles published in ETR & D and BJET journals between 2002 and 2014. In addition, it has been found that there have been more frequent studies on e-learning in recent years. On the other hand, according to the information obtained, journals were categorized according to their subjects and classified under 7 titles: online learning, learning environments, learning approaches, assessment and evaluation, instructional design, educational technology and learning theories. In this study, in which the meta-analysis method was used, it was stated that policy studies on ICT are few, mixed studies should be done more frequently in order to obtain strong results for the field, and the popularity of such trend studies will continue to increase in the future.

Apart from these studies, some studies have examined the processes of different journals in the last 20 years(e.g. Martin, López-Martín, Lopez-Rey, Cubillo, Moreno-Pulido, & Castro, 2018; Natividad, Spector, & Evangelopoulos, 2018; Del Rio, Spector, & Evangelopoulos, 2016). According to these studies, it has been observed that research on the use of educational technologies

has increased, while it has been concluded that social interest on issues such as MOOC, distance education, online learning, mobile learning, and communication strategies has increased and the research trend in the field is gradually different. It was also stated that such studies are an important source of information to provide information on determining future research topics.

Today, with the expansion of online education environments, a huge amount of data is produced and researches are carried out in the field of education technology (Ferreira - Mello, André, Pinheiro, Costa, & Romero, 2019; Gürcan, & Özyurt, 2020; Baddam, Bingi, & Shuva, 2019. ; Marti Parreño, Méndez Ibáñez, & Alonso Arroyo, 2016). Therefore, text mining studies are carried out on a wide variety of topics in order to better analyze data in the field of education (e.g. Nakagawa, Asakawa, Yamada, Ushikubo, Yoshida, & Yamaguchi, 2012; Ferreira - Mello, André, Pinheiro, Costa, & Romero, 2019; Méndez Ibáñez, & Alonso Arroyo, 2016; Baddam, Bingi, & Shuva, 2019; Chen, Xu, Jin, & Wanatowski, 2019; Gürcan & Özyurt, 2020). While the most used text mining techniques in these studies were observed as classification, clustering, information retrieval and natural language operations, it was determined that electronic libraries, forums and online academic resources were used for text mining, and the main goal of the studies was generally related to the change of student performance. (Ferreira - Mello, André, Pinheiro, Costa, & Romero, 2019).

Chen, Xu, Jin, & Wanatowski (2019) aimed to expand existing studies by examining a total of 1810 journals published since 1982 for engineering education by using the text mining method. The profiles of the subjects covered were determined by classifying them into 4 different periods according to the subjects of the journals examined in the study. It was predicted that the integration of pedagogical methods in engineering education, examination of demographic differences and distance education that is being developed by IT will be examined more for future researches.

In the study conducted by Gürcan and Özyurt (2020), 27,735 articles were examined in order to see the general profile of the studies in the field of e-learning in the last 10 years using data mining method. According to the analysis results of this study, the e-learning area is clustered in 5 dimensions. Accordingly, it is stated that measurement and evaluation, learning environments, teaching models, teaching areas and teaching tools will provide significant benefits to the field of e-learning.

When we look at the national studies conducted in Turkey, Şimşek et al. (2008) determined the current trends in educational technology research in Turkey, and in the study of Erdoğmuş and Çağıltay (2016), the trends in master's and doctoral theses in the field of instructional technologies in Turkey. In the study of Şimşek et al., (2008), a general evaluation of the doctoral dissertations completed in the field of educational technology in the last ten years before the date of the study was made in five universities. In this study, it has been determined that there are researches on learning in computerized systems, instructional design variables and learning approaches as the subject of study. On the other hand, Erdoğmuş and Çağıltay (2016), on the other hand, have determined that many different subjects such as media forms, media comparison, educational variables, student outputs, teaching material development, teaching/learning perspective, educational methods, evaluation are discussed as the subject of study.

## The Significance of the Study

Studies carried out with such approaches cannot reflect the whole area, either because it takes too much time or because it is only for a specific area. For example, in various studies conducted for this purpose, it is seen that the content analysis method is used or focused on one of the subject areas of Educational Technology (Bodily, Leary, & West, 2019; Hsu et al., 2012; Hsu, Hung & & Ching, 2013; Hwang & Tsai, 2011; Wu, 2013). Teherfore, using text mining to provide a “snapshot” of the field will provide a broader view and serve as a corrective to these issues (Li, Antonenko, & Wang, 2019). The purpose of this study was thus to first use numerical data to describe the studies in the field of Educational Technology, and then to use text mining to produce a “snapshot” of the entire field. For this purpose, answers were sought to the following research questions:

RQ1: What are the bibliometric features of studies in the field of Educational Technology?

RQ2: How are the studies in the field of Educational Technology classified?

RQ3: What trends can be seen in studies in the field of Educational Technology?

## Methodology

### Bibliometrics

Bibliometry is a statistical analysis method that allows a general overview to be obtained by visualizing and summarizing studies using variables such as individuals, institutions, journals, articles, books, and websites, publication year, countries, number of citations, and authors’ information(Okubo,1997; Hung, 2012; Karanatsiou, Misirlis, & Vlachopoulou, 2017; Thelwall, 2008; Martín-Martín, Orduna-Malea, & Delgado López-Cózar, 2018; Zanjirchi, Rezaeian Abrishami, &Jalilian, 2019).

Bibliometry provides an idea of the work done, enabling researchers to identify and evaluate the impact of previous research on disciplines related to the fields studied (Cooper,2015; Castellani, Pontecorvo, & Valente, 2016). The data obtained can allow a reader to gain a sense of the past and future relevance of the studies (Van Leeuwen, 2007). The graphs formed as a result of bibliometric analysis of the statistical data make it easier for the reader to analyze and interpret the work that has been carried

out. However, the bibliometric method may not be sufficient to adequately determine the themes or methodologies involved in specific studies (Zanjirchi, Rezaeian Abrishami, & Jalilian, 2019). For this reason, more detailed and comprehensive researchusing the text mining method may be required(Zanjirchi, Rezaeian Abrishami, & Jalilian, 2019; Hung, & Zhang, 2012; Wilson, 2016).

### Text Mining

Text mining is a data mining technique used to reveal hidden and meaningful structures in any given data (Gupta & Lehal, 2009). Data mining can be defined as the process of discovering information present in databases. It involves the pre-processing, selection, and conversion of data, and the evaluation of the information which emerge s(Fayyad, Piatetsky-Shapiro & Smyth, 1996).Unlike other forms of data mining, text mining uses instances of text as the data set. Text mining is the process of automatically revealing a set of texts that do not appear to be relational, insignificant text blocks, or information (Hung & Zhang 2012) from databases of previously unknown information (Härkänen, Paananen, Murrells, Rafferty, & Franklin, 2019). Summarizing the information already present but previously unutilized in the databases enables the desired analyses and trending researches to be conducted (Feldman & Dagan,1995).

### Data Collection Process

Studies published between 2000-2020 in the top ten journals in the Educational Technology subcategory of the Social Sciences category of Google Scholar were selected for inclusion in this research. The results were filtered by "Article" and those with "Early Access" were removed from the data set since there was a problem accessing these articles. As a result, 10.218 articles were accessed.

The studies were downloaded in text format for use in MS Excel, and the VOS viewer, and SAS Enterprise Miner programs. After the text that was relevant to this research had been isolated, the remaining text was deleted from the articles. The names of the journals, keywords, names of countries, and publication years were retained for use. In addition, tools from the Web of Science were used for descriptive data such as document type, year of publication, and country of origin.

### Data Analysis & Visualization

The SAS Enterprise Miner and VOS viewer programs were used to analyze the data. SAS is a program that can analyze sets of text using various tools, reveal the relationship between words in different texts, and hierarchically group and analyze large amounts of data (Hung,2012; Hung, & Zhang, 2012). Moreover, the SAS program allows large amounts of data to be interpreted through visualization of the relationships in the data (Härkänen, Paananen, Murrells, Rafferty, & Franklin, 2019, Hung,2012; Hung, & Zhang, 2012). The data to be analyzed were thus transferred to the SAS program so the necessary operations could be performed. As shown in Figure 1,this process includes nodes for “File Import”, “Text Parsing”, “Text Filter”, “Text Cluster”, and “Graph Explore”.

First, the "File Import" node in the "sample" section was added to run the data in the program with the extension ".xslx," and the data was saved to the program thanks to this node. The “Text Parsing” node was then used to automatically process and divide the samples of text and prepare them for data mining (Hung,2012; Härkänen, Paananen, Murrells, Rafferty, & Franklin,2019; Bayrak, 2020). After checking that the data had been uploaded to the program, the "Text Parsing" node was used from the "Text Mining" section. For the “Text Parsing” node, only the keywords (DE) heading was activated from the "Edit Variables" table, and the next step was carried out by parsing.

A “Text Filter” node was employed so that only data related to each other were used, to disable data that were not intended for use and to monitor the data (Härkänen, Paananen, Murrells, Rafferty, & Franklin, 2019; Härkänen, Vehviläinen-Julkunen, Murrells, Paananen, Franklin,& Rafferty, 2020). Accordingly, the "Text Filter" node was used to filter by keywords. Only the keywords heading was activated from the "Edit Variables" table for the “Text Filter” node, and the next stage, ‘filtering’, was initiated.

The “Text Cluster” node is used to classify terms with similar structure and content in textual data (Bayrak, 2020; Härkänen Paananen, Murrells, Rafferty, & Franklin, 2019; You, 2014; Payton, Yarger, & Pinter, 2018). After the parsing and filtering process, the "Text Cluster" node was used from the "Text Mining" section so that the keywords can be classified. Therefore, the "Text Cluster" node was used.

The "Graph Explore" node in the "Explore" section was used to convert the keywords allocated to clusters into a graphic format, and the graphical results of the data were obtained for this purpose. In addition, to report the results of all transactions, the "Reporter" node in "Utility" section was used, and the report of the results was saved in pdf format. The results and the names given to the clusters were presented to the field experts, and a reporting process was started in order to name the clusters formed in this way.

Data visualization was carried out to increase the readability of the data. SAS Enterprise Miner was used for this.

## Findings

### Bibliometrics of the articles published in the top ten journals in Educational Technology

Findings on RQ1 are presented under three headings: Number of articles by year, issue by country, and number by journal. Findings related to this are given below.

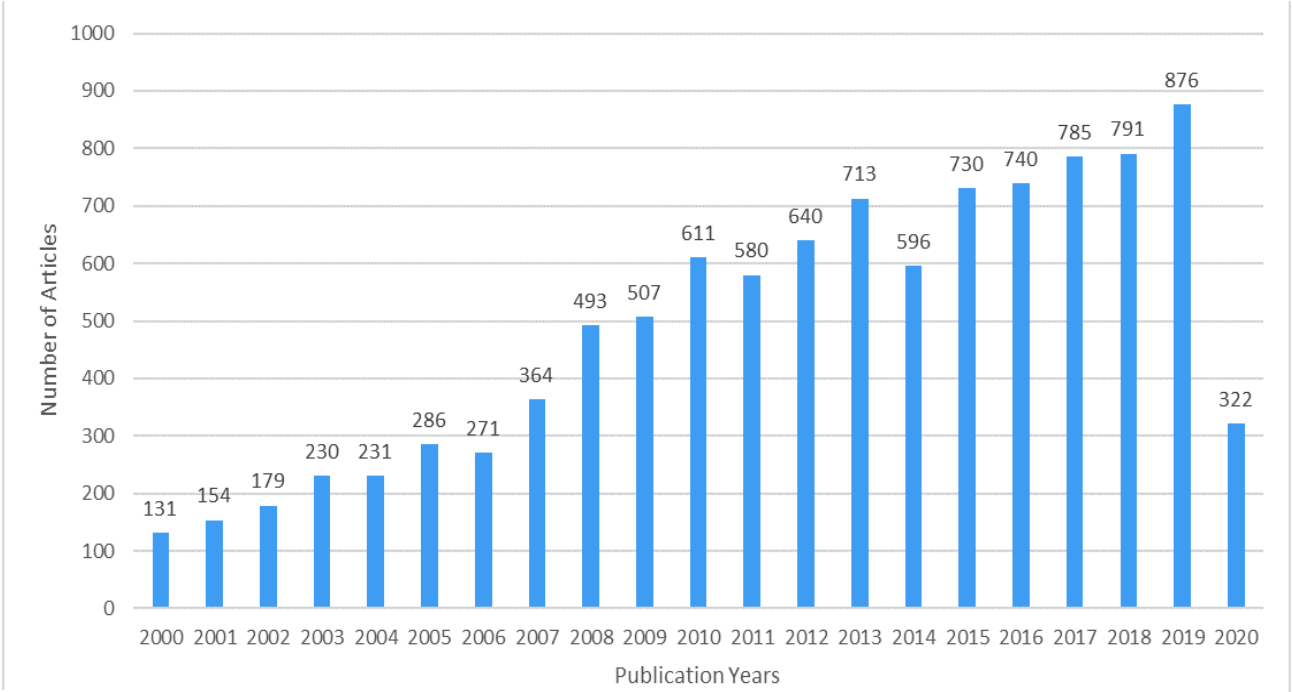


**Figure 1. Number of Articles by Year**

Figure 1 shows the distribution of the numbers of article by year. The greatest number of articles was published in 2019 (N = 876), and the fewest articles were published in 2000 (N = 131). Although the numbers decreased in some years compared to the previous years, the data show that for the last five years the number of articles has been increasing year-on-year. It can be assumed that the spread of the internet and changes to the online access policies of the journals have had an impact. Given the data, it can be predicted that the number of articles will continue to increase in 2020.

Figure 2 shows the number of articles by journal. Computers & Education published the most articles (n= 3142), and the International Conference on Learning Analytics and Knowledge published the fewest articles (n=125). Given that learning analytics is a new and growing field, this finding was to be expected. When the other journals were examined, it was found that the British Journal of Educational Technology published 1728 articles, the Journal of Educational Technology & Society published 1413, and the Journal of Computer Assisted Learning published 914 articles.

Figure 3 presents the distribution of articles by country. The ten countries that published the most articles between 2000 and 2020 were the USA (n = 2526), Taiwan (n = 1491), England (n = 977), China (n = 627), Australia (n = 594), Spain (n = 485), Canada (n = 483), the Netherlands (473), Turkey (n = 403) and Germany (n = 297). The regions of the world most predominantly represented were thus North America, Asia, and Europe.

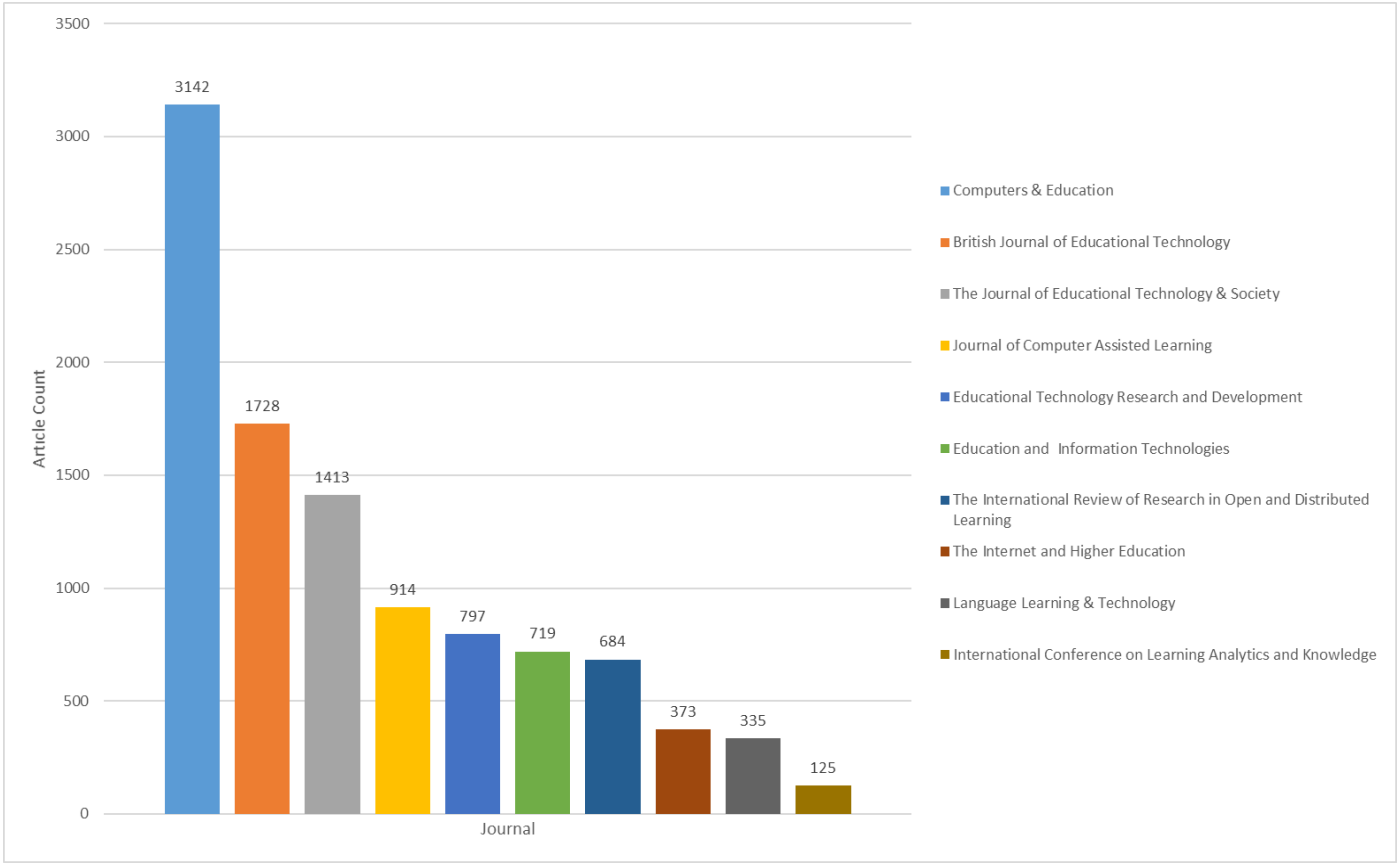


**Figure 2. Numbers of Articles by Journal**

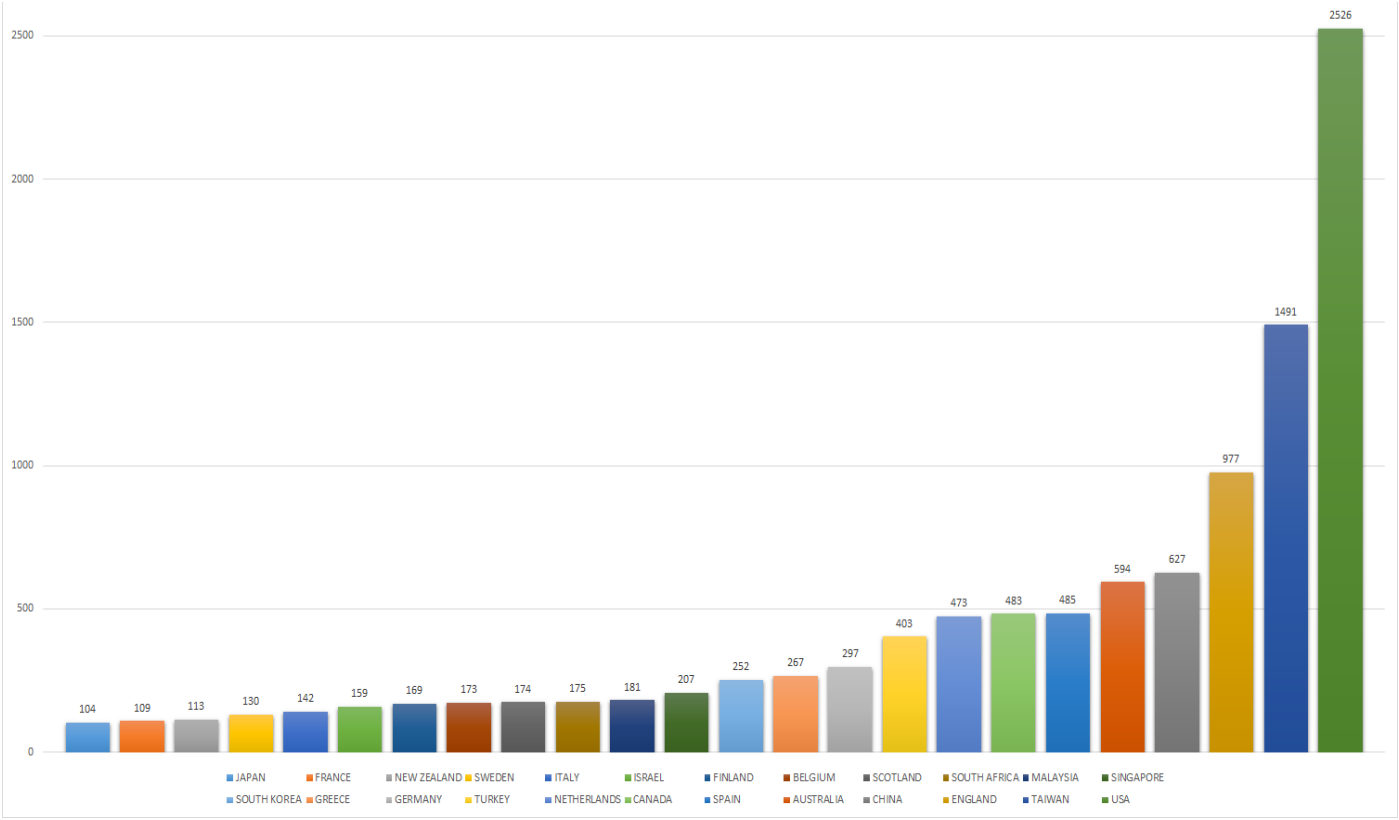


**Figure 3. Numbers of Aticles by Country**

### Clusters of articles in Educational Technology

Figure 4 shows the numbers of clusters formed according to the similarity of the keywords within the articles. These included: MOOCS (N = 255), Pedagogical Issues in Distance Education (N = 456), Hypermedia (N = 1001), Evaluation (N = 368), Technology Acceptance Model (N = 473), Computer Supported Language Learning (N = 574), Achievement and Engagement in Online Learning (N = 555), Open Educational Sources (N = 294), Computer Integration (N = 534), Cognitive Load Theory (N = 649), e- learning in Higher Education (N = 491), Digital Assessment (N = 649), Instructional Design and Social Presence (N = 706), Computational Problem Solving (N = 278), Human-Computer Interface (N = 408), Virtual Reality Environments (N = 454), Educational Games (N = 412), Teaching Strategies (N = 639), Motivation in Language Learning (N = 449) and Online and Mobile Learning (N = 543). According to the information in the table, the most studied area between 2000-2020 was Hypermedia, and the least studied area was MOOCs.

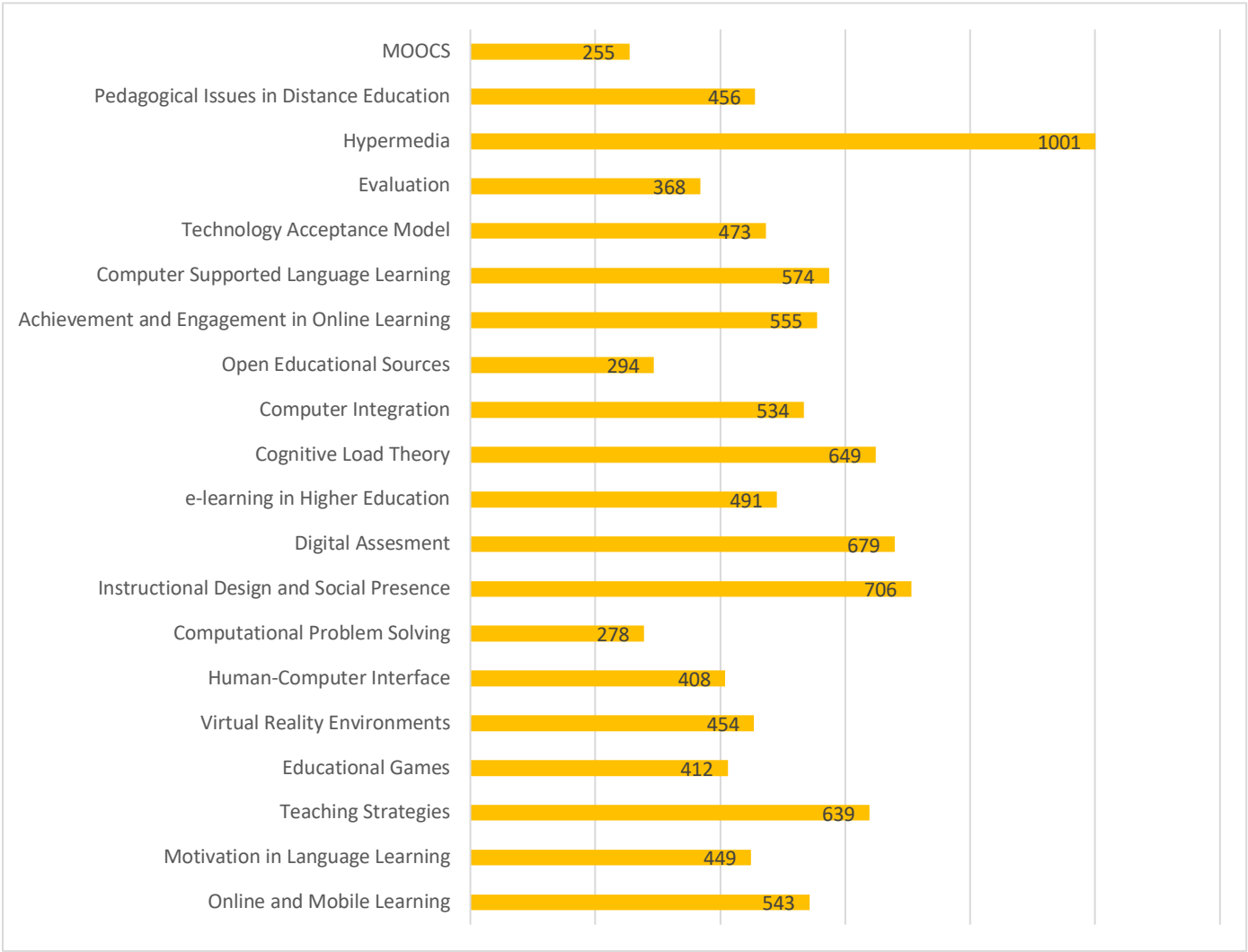


**Figure 4. Article Numbers of Cllusters**

It is possible to collect the clusters under seven topics; Assessment, Language Learning, Instructional Design, Technology in Learning Environments, Theoretical Foundations, Computational Thinking, and Online Learning.Evaluation and Digital Assessment Clusters can be positioned under the Assessment topic. Considering that one of the general aims of educational technology research is the answer to the question of "how do I teach?", It is inevitable that evaluation of the developed product and teaching process are also included in educational technology studies. It is inevitable that evaluation and digital assessment clusters take part in educational technology studies.

Language teaching is a discipline in which educational technologies work closely due to the need for audio and video materials. Accordingly, Motivation in Language Learning and Computer Supported Language Learning clusters have found a place in educational technology studies (Kukul & Aydın, 2020). In addition, motivation is known to be a variable studied in educational technology research (Li, Antonenko, & Wang, 2019).

Instructional Design is used instead of the term educational technologies or instructional technologies in some researches (Reiser, 2007). Instructional Design shows itself in different studies (e.g. Kukul & Aydın, 2020; Li, Antonenko, & Wang, 2019).

Instructional design generally includes "How Teaching?" Teaching strategies cluster and Instructional Design and Social Presence cluster can be grouped under the Instructional Design theme. The concept of Social Presence is a variable studied mostly in distance education (e.g. Aragon; 2003; Tu, 2002; Tu & McIsaac, 2002; Richardson, Maeda, & Caskurlu, 2017). From this point of view, it can be interpreted as instructional design is mostly used in distance education design (Kukul, & Aydın, 2020).

Six different clusters can be grouped under the Technology in Learning Environments topic. These are Educational Games, Virtual Reality Environments, Human-Computer Interface, Computer Integration, Hypermedia, e-learning in Higher Education. Among these clusters, Hypermedia stands out with its number of articles. Investigating the effect of hypermedia on learning for a period in computer-supported learning studies (Li et al., 2019) has been effective in the formation of this cluster.

We can say that there are two clusters under the Theoretical Foundations topic. These are the Cognitive Load Theory and the Technology Acceptance Model. Cognitive load theory is concerned with the processing of information by the human mind during cognitive learning and the capacity of memory types (Li et al., 2019). As a result of educational technology research being under the influence of cognitive learning theory for a long time, this theory has been frequently studied in the field of educational technologies. Technology Acceptance Model, on the other hand, is a theory that derives from the Theory of Planned Behavior and explains the behaviors of people using technology with different variables and is frequently studied in the field of educational technologies.

Computational Thinking concept is included in the research as a single set. It is a concept that was first used by Seymour Papert, but became popular in 2006 by Jeannette Wing (Kukul & Karataş, 2019). It is considered a 21st century skill that all individuals should have. Therefore, technology has started to be used in educational environments to develop computational thinking skills of individuals.

Under the Online Learning topic, there are Online and Mobile Learning, Open Educational Sources, Achievement and Engagement in Online Learning, Pedagogical Issues in Distance Education, MOOCS clusters. Distance education applications constitute a large part of educational technology studies. The global pandemic process shows that these clusters will mostly be studied in the field of educational technologies.

### Trends in Clusters in Educational Technology

Considering the distribution of clusters by years, it is seen that the number of researches increases every year. It can be seen that especially until 2008, hypermedia has been studied more than other clusters. As of 2009, it is seen that especially the Teaching Strategies cluster is involved in the field of Educational Technology. After 2011, it can be said that all clusters are distributed in a balanced way.

When the distribution of clusters according to journals is examined, it is possible to say that the Hypermedia cluster is included in the British Journal of Educational Technology and the Teaching Strategies cluster in the Computer & Education. Computer Assissted Language Learning appears as a journal in which the Motivation in Language Learning and Computer Supported Language Learning clusters are seen widely. In addition, Journal of Educational Technology & Society appears as a journal in which the Computer Supported Language Learning cluster is widely seen.

Computers & Education, as the journal that publishes the most research studies in the field of Educational Technology, can be regarded as natural that many clusters appear too many in that journal. In the journal, it is seen that there are many studies on Teaching Strategies, Evaluation and Digital Assessment clusters. The clusters outside of these clusters are evenly distributed in proportion to the number of journals' publications.

When the time trends of clusters are examined, it is seen that many clusters are generally in an upward trend. In addition, many clusters have increased in parallel with the rise in the numbers of educational technology research studies, especially after 2008. At this point, some clusters differ from others. One of them is the Hypermedia cluster where the most publications are made. The Hypermedia cluster has been in a downward trend after 2008. Another cluster that tends to go down like Hypermedia is the Evaluation cluster. However, it is seen that the Digital Assessment set has increased after 2008, in contrast to Evaluation. Although not as much as Evaluation and Hypermedia, other clusters in declining trend were Teaching Strategies, Pedagogical issues in Distance Education and Human Computer Interface. It is observed that clusters other than these clusters are in an upward trend even if they do not increase regularly every year.

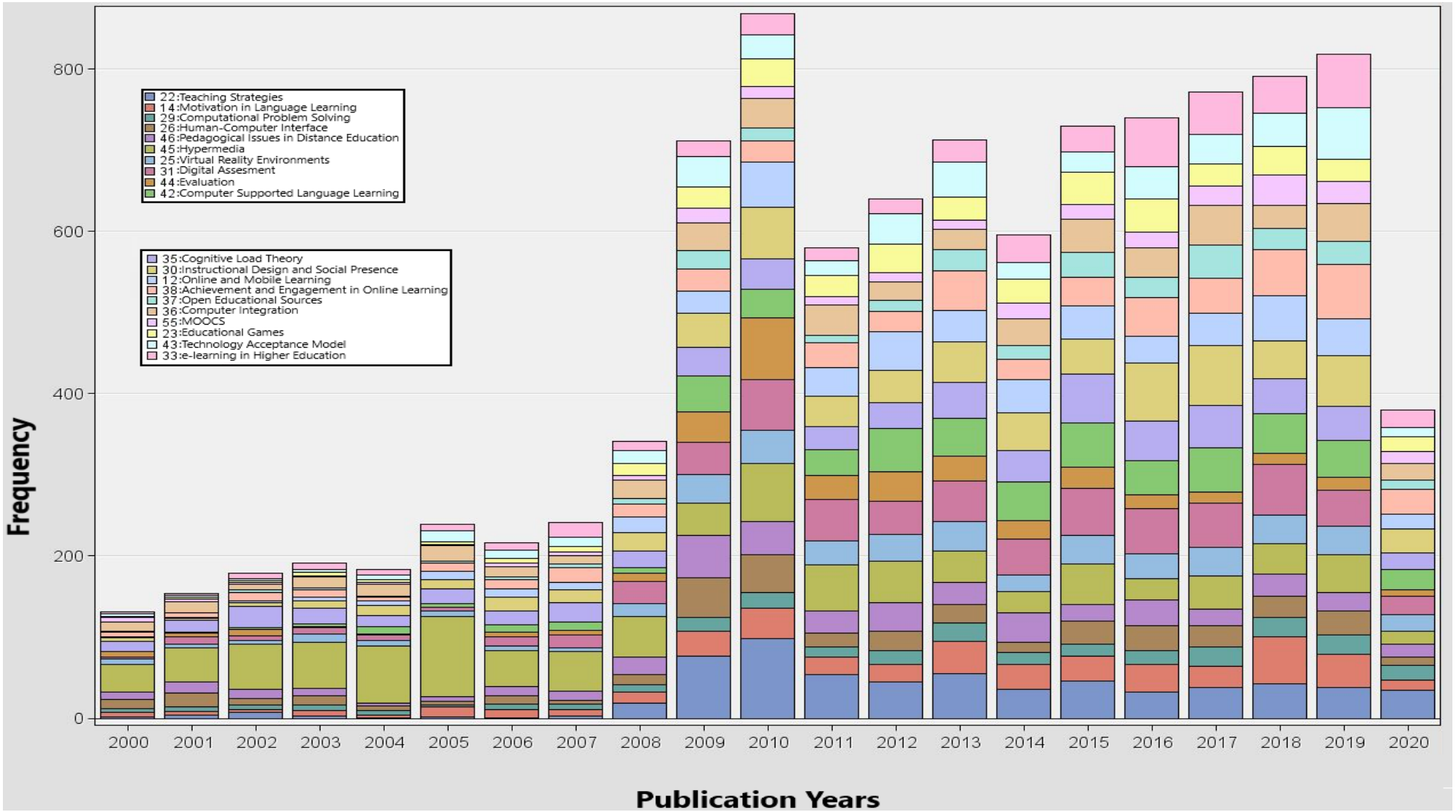


**Figure 5. Trends of Clusters According to the Years**

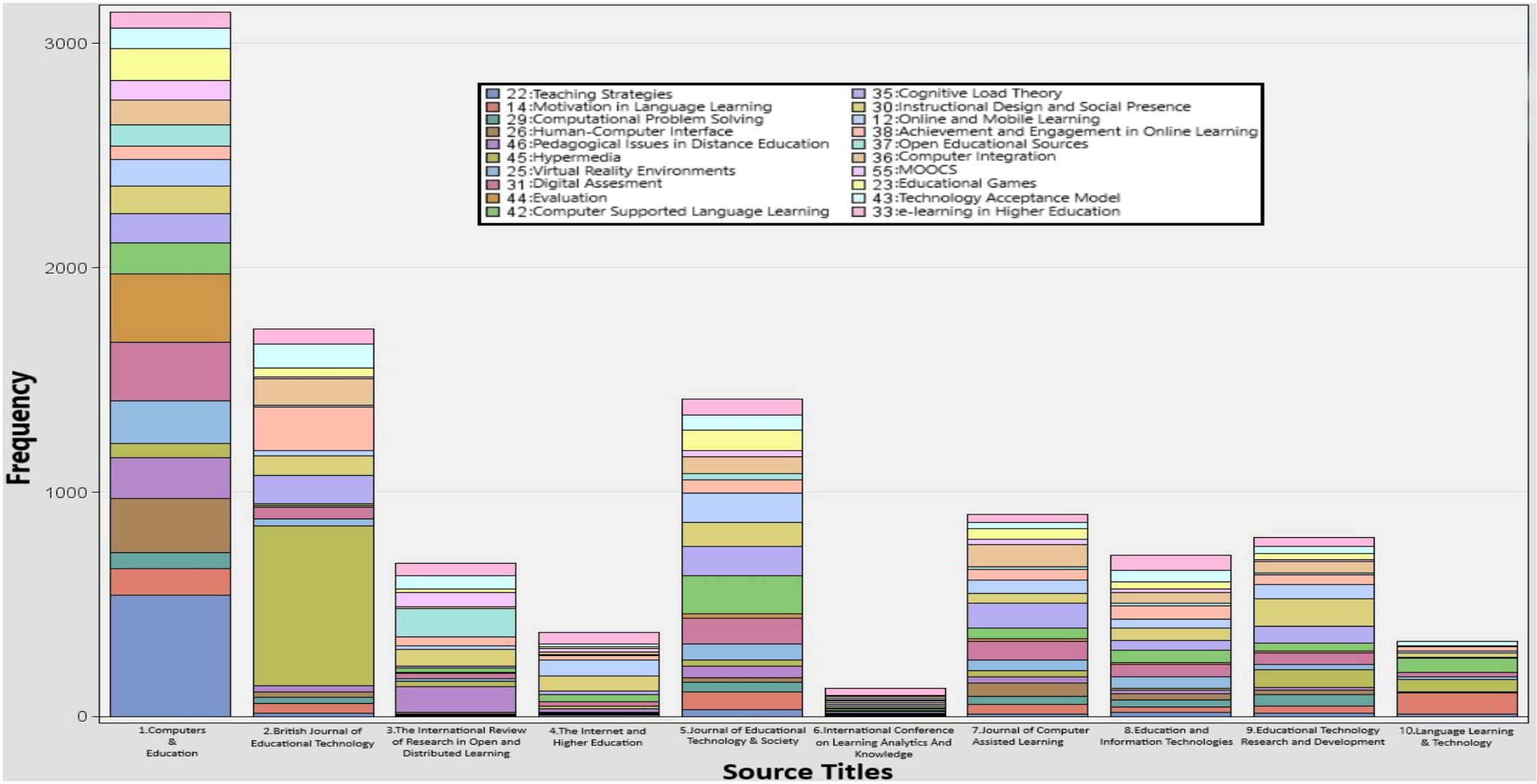


**Figure 6. Trends of Clusters According to the Journals**

## Conclusion

This study aimed to use Google Scholar Metrics to determine trends in articles published in the top ten Educational Technology journals between 2000 and 2020. The articles were first analyzed bibliometrically, and then text-mining techniques were used to determine how they were clustered. The number of articles increased each year. That is why the trend of most of the clusters was to grow. The study found that there were 20 different thematic clusters in the field of Educational Technology.

When the clusters were examined by journal, it was seen that articles on Teaching Strategies were mostly published in Computers & Education while those on Hypermedia were most published in the British Journal of Educational Technology. Since Computers &Education is the journal where most articles are published, it could be considered natural that it would include the most clusters. However, articles on Hypermedia, and Achievement and Engagement in Online Learning were mostly published in the British Journal of Educational Technology.

When the trends for each cluster were examined, it was seen that the number of articles in the Computational Problem-Solving cluster began to increase after 2006. It can be said that the growing popularity of the concept of "computational thinking", following its definition by Wing in 2006 (Kukul & Karatas, 2019; Román-González, 2015; Roman-Gonzalez, Perez-Gonzalez, & Jimenez-Fernandez, 2017; Roman-Gonzalez, Perez-Gonzalez, Moreno-Leon, & Robles, 2018), had an impact on this increase. The graphic showing the trend over time for Computational Problem-Solving shows that, although the number of articles in this cluster is no greater than in others, it is a topic that is likely to remain popular in the future.

The same situation is valid for the MOOCs cluster. The graphic shows that research on MOOCs increased after 2008. This was the date when the first MOOC opened at the University of Manitoba (Liyanagunawardena, Adams, & Williams, 2013). It is likely that, after the CoVID-19 Pandemic, MOOCs will become even more valuable, and the number of articles on them will likely increase in the coming years. The increase in the number of articles in the Open Education Sources Cluster supports this conclusion. The prevalence of articles in this cluster is increasing in parallel with those about MOOCs.

The number of articles in the Teaching Strategies, Pedagogical Issues in Distance Education, and Evaluation clusters decreased after 2009 and 2010. This suggests that research is increasingly focusing on learners. The rapid development of technology is changing the roles and competencies of instructors, and this may be one of the results. It can be said that there needs to be more studies about instructors.

It has been seen that the most studied theories in the field of educational technologies are Cognitive Load Theory and Technology Acceptance Model. Li et al. (2019) similarly revealed that Cognitive Load Theory is frequently studied in multimedia studies. When examined in terms of variables, it is seen that Motivation, Achievement, Engagement and Social Presence variables find their place in educational technology studies.

Although the field of Educational Technology is often seen as an umbrella term for other disciplines, only Language Learning, as a separate field of study, finds a place as one of the clusters. This finding can be interpreted as showing that Language Learning is the discipline that most interacts with Educational Technology.

Although the number of articles examined in this study is large, there are some limitations. First, the Social Science Citation Index, one of the important indexes, is scanned in such studies. However, it is known that there are valuable research studies that contribute to many areas outside of this index. In addition, the field of educational technology is seen as an interdisciplinary field as stated before. Therefore, it is known that more subject areas are concerned with the clusters formed here. Different perspectives can be revealed by using different methods in similar data sets.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Statements of publication ethics

I/We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

## Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

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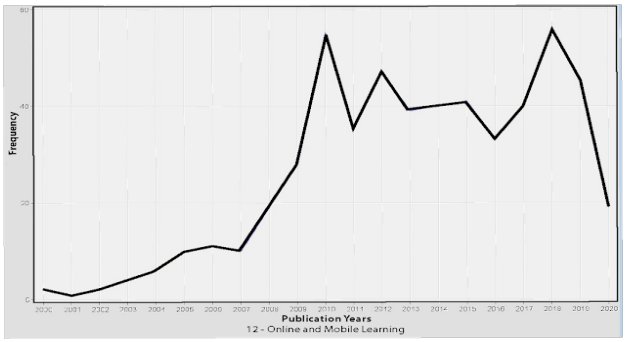
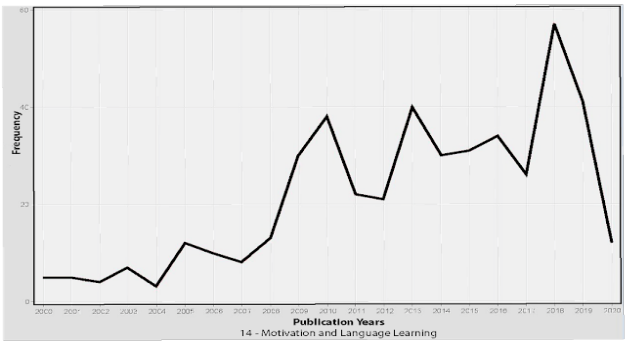
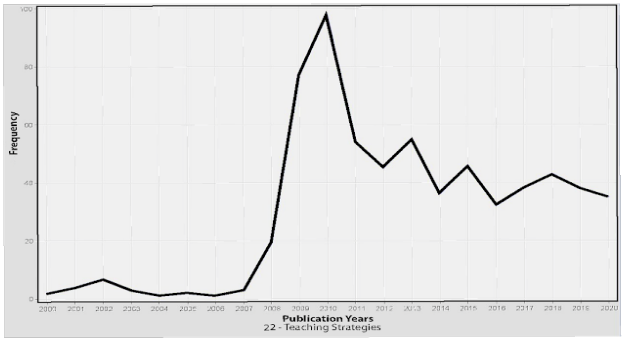
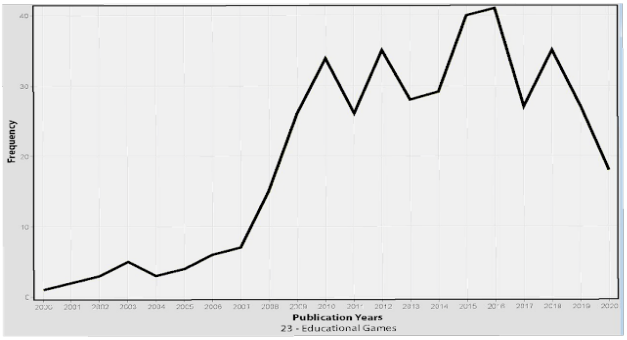
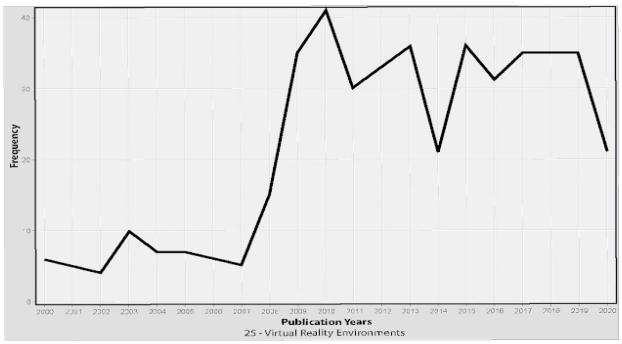
**Annex-1**

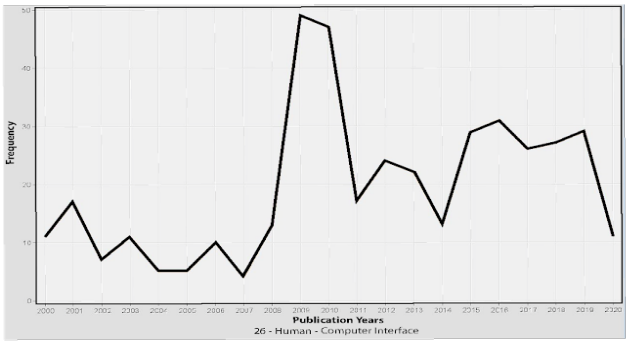


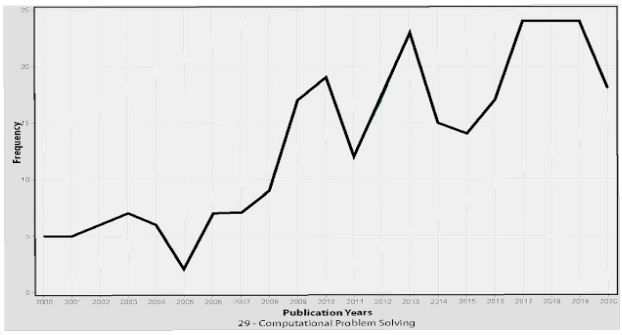



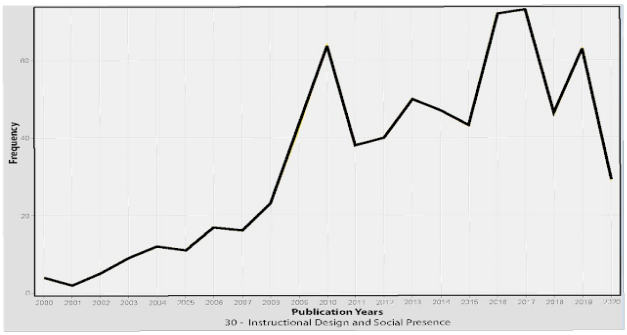



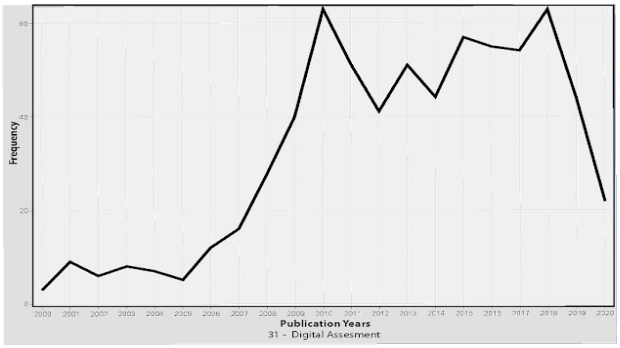



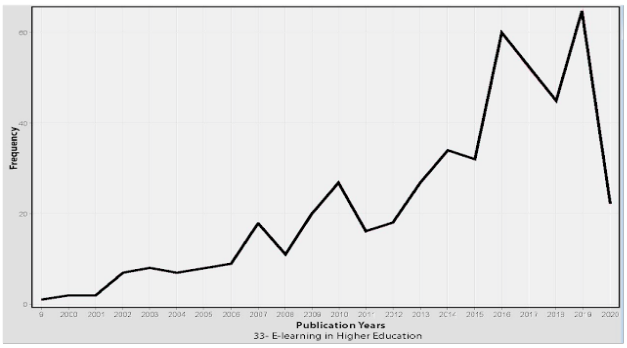




**Figure 7.Time Trends of Clusters - 1**

**Annex-2**

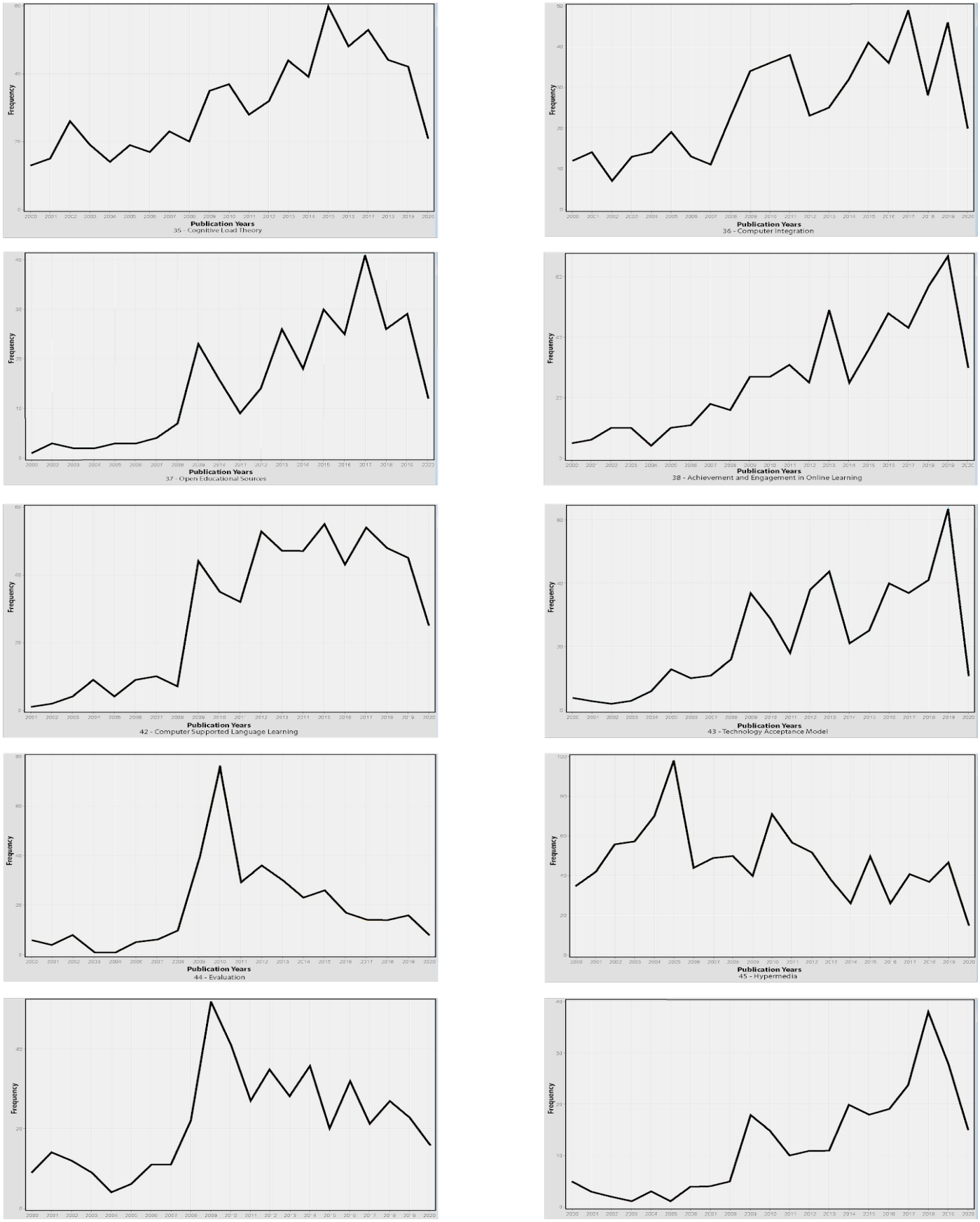



**Figure 8.Time Trends of Clusters - 2**

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| Research Article / Araştırma Makalesi |

# Experiences of a Mathematics Teacher Implementing Micro Learning During Emergency Distance Teaching

# Acil Uzaktan Öğretim Süresince Mikro Öğrenme Uygulayan Bir Matematik Öğretmeninin Deneyimleri

**Zühal Gün Şahin[1], Hafize Gamze Kırmızıgül[2]**

**Keywords**

1. E-learning
2. Micro learning
3. Mathematics teaching
4. Teacher experience
5. Information and communication technology (ICT)

**Anahtar Kelimeler**

1. E-öğrenme
2. Mikro öğrenme
3. Matematik öğretimi
4. Öğretmen deneyimi
5. Bilgi ve İletişim teknolojileri

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## Abstract

*Purpose:* The aim of this study is to contribute to a better understanding of the effects of digital sources on the works and professional development of mathematics teachers. In line with this aim, the microlearning experiences of an experienced secondary-school-mathematics teacher who is pursuing a Ph.D. in a university, in an e-learning environment is the focus of this study.

*Design/Methodology/Approach:* The study design is a narrative analysis. The researcher's diaries and interview recordings were analyzed in this context. The researcher diaries were written by one of the researchers, a PhD student mathematics teacher who took an active role in the practice. In addition, the semi-structured interview recordings with the same teacher are included in the research as data and documents, and they were analyzed in detail. The diaries of the teacher, the researcher, which are kept during the microlearning period and the interviews were analyzed using the content analysis method. Categories and codes were created as a result of the analysis.

*Findings:* As a result of the analysis, it was identified that the teacher especially focused on the teachers' concerns before teaching using microlearning and how these concerns change in time, the process of preparing digital lessons, student observations during the implementation, and changes within herself in diaries and interviews.

*Highlights*: The study has revealed important results in terms of supporting e-learning. It may be recommended to integrate micro learning and micro content into mathematics and other courses. By eliminating the limitations of the research, comprehensive research of qualitative, quantitative, or mixed type can be conducted with more participants.

## Öz

*Çalışmanın amacı:* Bu çalışmada dijital kaynakların matematik öğretmenlerinin çalışmaları ve mesleki gelişimleri üzerindeki etkisinin daha iyi anlaşılmasına katkıda bulunmayı amaçlıyoruz. Bu amaçla, ortaokul düzeyinde deneyimli bir matematik öğretmeninin e- öğrenme ortamında gerçekleştirdiği mikro öğrenme deneyimine odaklanılmıştır.

*Materyal ve Yöntem*: Çalışma tasarımı bir anlatı analizidir. Araştırmacı günlükleri ve görüşme kayıtları bu bağlamda analiz edilmiştir. Araştırmacı günlükleri, uygulamada aktif rol almış, araştırmacılardan biri olan doktora öğrencisi matematik öğretmeni tarafından yazılmıştır. Detaylı olarak analiz edilmiştir. Öğretmenin, araştırmacı olarak mikro öğrenme sürecinde tuttuğu günlükler ve görüşmeler içerik analizi yöntemi kullanılarak analiz edilmiştir.

*Bulgular:* Analiz sonucunda, öğretmenin özellikle mikro öğrenmeyi kullanarak öğretmeden önce öğretmenlerin kaygılarına ve bu kaygıların zaman içinde nasıl değiştiğine, dijital derslerin hazırlanma sürecine, uygulama sırasında öğrenci gözlemlerine ve kendi içindeki değişimlere odaklandığı tespit edilmiştir

*Önemli Vurgular:* Yapılan çalışma e-öğrenmenin desteklenmesi açısından önemli sonuçlar ortaya koymuştur. Bu bağlamda öğretmenler açısından mikro öğrenme ve mikro içeriğin matematik ve diğer derslere entegre edilmesi önerilebilir. Araştırmanın sınırlılıkları ortadan kaldırılarak, daha fazla katılımcı ile nitel, nicel veya karma türde kapsamlı araştırmalar yapılabilir.

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## INTRODUCTION

The limits of time and location changed due to the rapid development of web technologies and mobile devices. Smartphones, tablets, and computers are being used in all areas of life with or without the internet with the developing information technologies, and they provide various conveniences. As digitalization increases in education systems around the world, many countries are updating their legislation and action plans to speed up the process (Fransson et al., 2018). This makes the issue of how to effectively integrate digital technology into teaching and learning practices (Viberg etal., 2020). Digital technologies are being actively used in education (e.g. smart boards, Web 2.0 devices, digital content, educational applications, etc.), teachers can access richer course content and prepare course content (Trouche et al., 2020). Students can also access information from wherever they want thanks to the technology.

It is desired that the content for teaching purposes developed is long-lasting, practical, reusable, can be combined with other teaching materials and is easy to access (Ceylan, 2008; Tekdal, 2004). The concept of learning objects that can carry these features has emerged. There are many definitions of learning objects. Cisco (2001) defines learning objects as small, reusable pieces of information independent of the environment. Polsani (2003) on the other hand, learning objects; It defines it as units of learning content that can be reused in different learning contexts, that can be found independently and on their own. Thanks to learning objects, students can easily access information whenever and wherever they want, thanks to learning objects.

As in other teaching areas, the use of digital technologies, and especially mobile technologies, in mathematics teaching and learning areas is attracting increasing attention among researchers and practitioners (Borba et al., 2017). For this reason, researchers began to consider designs that could integrate technology into mathematics learning environments, taking into account the opportunities provided by digital technology (Trouche et al., 2020). One of the learning environments focusing on digital technology is microlearning. Micro learning, a new learning style, is an innovative approach that will accelerate digitalization in mathematics teaching, attract students to mathematics, and combine technology and mathematics education.

### Micro Learning

Micro learning is a learning approach that aims to use students' time effectively to conduct personalized learning activities through online educational resources (Lin et al., 2020). Micro learning presents the users with personalized learning activities in small pieces and it is one of the best approaches for students in the 21st century (Jomah et al., 2016). Considering that people's attention span is getting shorter, micro learning becomes more important since it emphasizes short learning periods (Leong et al., 2020). This learning approach not only includes today's students in mobile-based micro learning but also provides a promising learning method for life-long (adult) students (Buchem & Henrike, 2010).

Micro learning arising from micro-content is a concept that expresses the way of transferring small digital information contents in the form of concise, condensed small groups, so to speak "factoids" (Mitchell, 2020). In microlearning, which facilitates the learning process by dividing the concepts into small parts or factoids, and also called as micro-content, small learning units are given to students gradually and in a way that suits them (Mohammed et al., 2018). Even though there are many definitions of microlearning, Hug's definition of micro learning based on seven dimensions is the most widely accepted (Hug, 2006). These seven dimensions are as follows: *(a) time,* spending relatively short time, providing low effort, etc. *(b) content***,** well-delineated short units, and relatively simple problems, *(c) curriculum*, sections of modules or parts of curriculum content, brief tutorials *(d) form*, pieces, factoids, lab assignments, etc. variety of formats; *(e) process* discrete, interconnected or real, situational or integrated activities, iterative method, attention management, awareness, etc. *(f) mediality***,** classroom-based learning or distance learning based on different multimedia content; *(g) learning type***,** repetitive, reflexive, pragmatic, constructivist, concept-based, connectionist, etc.

The seven dimensions put forward by Hug creates the framework of micro learning. The next step is to create micro-content by considering these dimensions. While designing micro content (Leene, 2006), some issues should be taken into consideration. These issues are as follows: *Form*, the micro-content should be designed so that the units are short, easy to detect at a glance (e.g without scrolling down for further information), and light enough to be quickly deployed across different media (e.g. simple construction, low resolution). *Focus*, the goal is that the topics should be clear and easily articulated in a few short and concise sentences. *Autonomy* means that each piece of micro-content is independent so that students do not have to search for additional information. *The structure* is a condensation of simple, yet essential information (title, subject, author, date, tags, etc.). *Simple access* is that micro-content is designed to be hosted as a single resource on the internet, but is also easily accessible from any other location.

Even though micro learning has different concepts and versions (Hug, 2005), according to Buchem and Hamelmann (2010), the common feature of micro learning is that it includes micro-content, a single identifiable idea, and a short learning time (no longer than 15 minutes). Micro learning is becoming more popular thanks to the features such as being learner-centric, cost-effective, interactive, and making learning effective (Jomah et al., 2016). Lin et al., (2020) defined the micro-content creation steps as follows:

(1) While preparing micro-content check whether the content is suitable for microlearning.

(2) If the content is not suitable for micro learning, divide the contents into small and independent micro-contents that are meaningful in itself.

(3) Add explanations for each micro-content.

(4) After the preprocessing, the content becomes available and can be used as a micro learning resource.

Micro learning has benefits such as increasing student participation (Nikou, 2019), making the concepts to be better kept in mind (Giurgiu, 2017), including simple and narrow subjects (Jomah et al., 2016), providing opportunities for repetition (Hug, 2005). In addition, Jomah et al., (2016) stated that micro learning is an attractive option because it handles the subjects in accordance with the individual needs of the students. Besides, another important benefit of microlearning is that it increases students' motivation (Nikou & Economides, 2018). In addition to these important benefits, micro learning has some limitations (Jomah et al., 2016). According to Jomah et al. (2016), these limitations are that it is not suitable to be used in situations where complex skills, processes or behaviors need to be acquired, and it is insufficient to provide explanatory feedback to students.

Teachers are the people who will transfer teaching with digital technologies which are the necessities of our age, such as micro learning, to the classroom environment. Pre-service and post-service training is provided to increase the productivity of teachers (Harris & Sass, 2011). Various frameworks, models, and literacy have been developed in various educations to support teachers to use new and emerging technologies in their classrooms (Falloon, 2020). In this article, we aim to contribute to a better understanding of the impact of digital resources on the work and professional development of mathematics teachers. For this purpose, the article focused on the micro learning experience of a mathematics teacher who is experienced in secondary-school-mathematics, and who is pursuing a Ph.D. degree in Turkey, in an e-learning environment. As in many other countries, Turkey had to do "emergency distance education" due to the Covid-19 outbreak in mid-March 2020 (Özudogru, 2021). This study will reveal the micro learning experiences of a mathematics teacher in the emergency distance education process. This study provides an understanding of the use and design of digital resources in the teaching of mathematics teachers. In this context, the aim of the study is to convey the experiences and opinions of the mathematics teacher who teaches using micro learning in the e-learning environment. In this context, the research question of the study was determined as follows:

"What are the experiences and views of the teacher who taught mathematics through micro learning for the first time?"

## METHOD

### Research Model

The narrative analysis (as a method) approach has been adopted in order to deal with the process in depth and multidimensionally in the study. In this context narrative research method was used. Narrative research, one or more It is the type of study that allows the presentation and research of experiences or individual experiences (Cohen et al., 2018). In order to achieve the aims stated in the narrative research, the interview and document analysis techniques frequently used in research has been used. Salmon (2008) argues that narratives connect experiences and thoughts and organize random and scattered discourses. In addition, the narrator makes sense of experiences and phenomena and makes associations (Riessman, 2008). The subject of narrative analysis in this research is the assessment of mathematics teacher's experiences, who teach using micro learning in an e-learning environment. In this context, researcher diaries and interview records were analyzed in document forms based on concepts and opinions to provide in-depth information and describe the situation in the current study. The researcher's diaries were prepared by the mathematics teacher who conducted the research and took an active role in the application, who is also studying for a Ph.D. In addition, semi-structured interview records with the same researcher were also included in the research as information and documents and were examined in detail. Figure 1 presents the schematized research process.


**Figure 1. Research process**

**Research Participants**

Two researchers who were involved in the planning and implementation stages of the research, worked collectively. The first researcher is an expert working as a faculty member, Ph.D., in the field of mathematics education. This researcher, who is the first author, was actively involved in the planning of the research, literature review, preparation of data collection tools, analysis, and reporting of data. At the same time, the first researcher conducted a semi-structured interview with the second researcher. The second researcher is a mathematics teacher who is pursuing her Ph.D. in the field of mathematics education and also works in a public secondary school affiliated with the Ministry of National Education [MoNE],. She has received various in-service trainings on digital transformation and Web 2.0 tools in distance education. In this context, the second researcher had an active role in conducting the research and preparing micro-content as the implementing teacher. In addition, as the implementing teacher, she wrote the research diaries and participated in the semi-structured interview, and explained the implementation process in detail. Within the scope of the research, 10 sixth-grade students studying in a public secondary school in a province of the Eastern Anatolia region of Turkey were also included as participants in the application.

**Data Collection Process**

In the research, the first phase of the data collection process is the literature review on the subject and the preparation of an implementation plan for the research. In the second phase, necessary information and explanations were provided to the students' parents about the research process. In this context, before the research, the parents signed voluntary participation forms, and necessary permissions were obtained from the parents. The current research was initiated on February 22, 2021, and was terminated on March 12, 2021, after a three-week teaching period. In the third phase, students were given information about the microlearning process and Web 2.0 tools, and visual examples of the micro-contents used were presented. The research was designed in a three-week period to teach the ratio subject in mathematics and its achievements in MoNE, (2018) Secondary School 6th Grade Mathematics Curriculum based on microlearning. The teacher used Prezi, Padlet, Khan Academy TR, Google Forms, Mindmeister, and Canva Web 2.0 tools to prepare micro-content. The second teacher had an active role in preparing the micro-content as the implementing teacher. In addition, the implementing teacher wrote the research diaries, participated in the semi-structured interview, and explained the implementation process in detail. Thus, diary and interview records are included as data collection tools in the research.

Researcher Diaries: The second researcher prepared them regarding the implementation process in the three-week research process. The researcher diaries kept by the researcher-teacher for 15 days were included in the data analysis. During the research process, the implementing teacher included in the diaries in detail the observations obtained from the students, with her own views and experiences, especially regarding the realization of microlearning. While writing a diary, the researcher can direct various questions to herself with both critical and reflective thinking (Ger, 2009). In this context, during preparing and writing diaries, the teacher asked herself: Are the micro-contents I have created useful? Do students adopt the microlearning method and benefit from it? Are there any actions that I am missing or doing wrong in the process? Is there a difference between the teaching process I planned and the teaching process I carried out? These questions have dynamically strengthened the research process and enriched microlearning in terms of its benefits to students.

Semi-structured Interview: The semi-structured interview between the first researcher and the implementing teacher lasted approximately forty minutes. In this context, data were obtained and recorded with a semi-structured interview form consisting of five questions. In the process of creating and finalizing the semi-structured interview form, expert opinions were sought and relevant literature was reviewed. The questions in the semi-structured interview form are as follows:

(1) Why did you want to teach using microlearning?

(2) Can you summarize your process to create digital content?

(3) Can you talk about your teaching process?

(4) How was the implementation?

(5) Do you have anything to add regarding the implementation?

Images from the micro-content preparation and researcher diary kept by the implementing teacher during the research process are given below.

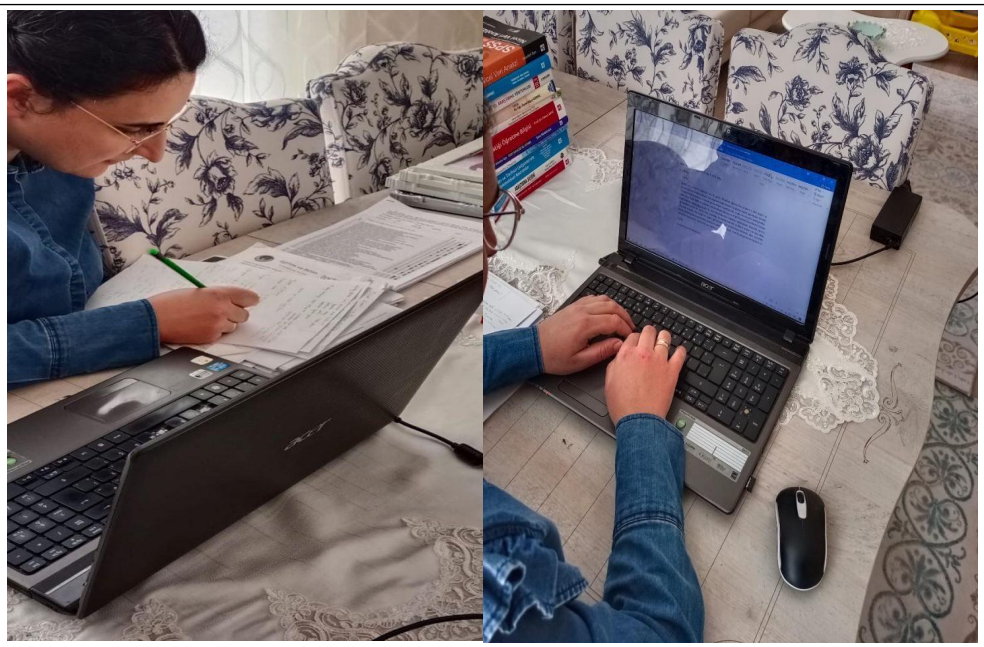

**Figure 2**. **Research diary writing process**

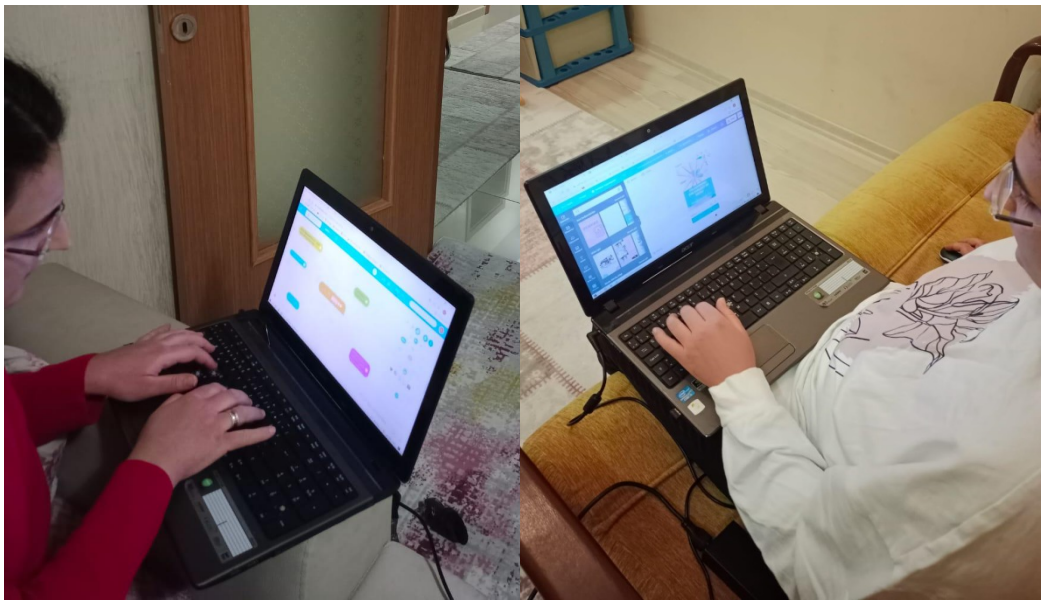

**Figure 3. Micro-content preparing process**

**Data Analysis**

The diaries and semi-structured interview records, which are the data in the research, were analyzed by the content analysis method. The data obtained in the content analysis are presented by combining similar concepts, categories, codes, and themes, and in a way that readers can understand (Creswell, 2014; Yıldırım & Şimsek, 2016). Content analysis of the researcher diaries and semi-structured interview records was carried out by considering the following stages:

(1) Coding by carefully reading every detail in the diaries,

(2) Gathering the generated codes within the framework of certain categories,

(3) Examining the similarities and differences of codes and categories,

(4) Finalizing the categories,

(5) Presenting categories and codes by interpreting them.

In this context, the categories and codes compiled from the data obtained are given under the findings. In addition, direct quotations from researcher diaries and semi-structured interview records are provided.

**Validity and Reliability of the Research**

In the research, data collection and the application process were carried out simultaneously. The data sources of the research consisted of the researcher herself and the students that she implemented the research on. Data collection tools are semi-structured interview records including the observations and the researcher diary. It was constantly checked whether the data obtained from the different tools specified confirmed each other. In addition, the reported findings and explanations of the data were supported by direct quotations from the diary and interview records. Thus, to ensure validity and reliability and to increase the credibility of the findings, it is important to use different data sources and data collection tools, to make a detailed literature review, and to benefit from expert opinions.

## FINDINGS

The diaries kept by the researcher-teacher during the micro learning period, and semi-structured interview records, were analyzed by the content analysis method. Codes and categories were created as a result of the analysis. The categories created in the study were grouped under four categories as follows: decision-making, preparation, concerns and expectations, and the process. The codes under the decision-making category are as follows: in-service training, effort, and curiosity. The codes under the preparation category are as follows: digital content preparation, and psychological background. The codes under concerns and expectations are as follows: success, background, and teaching process. The codes under the process category are as follows: content preparation, satisfaction, and student performance. Figure 4 presents the codes and categories obtained as a result of the analysis.

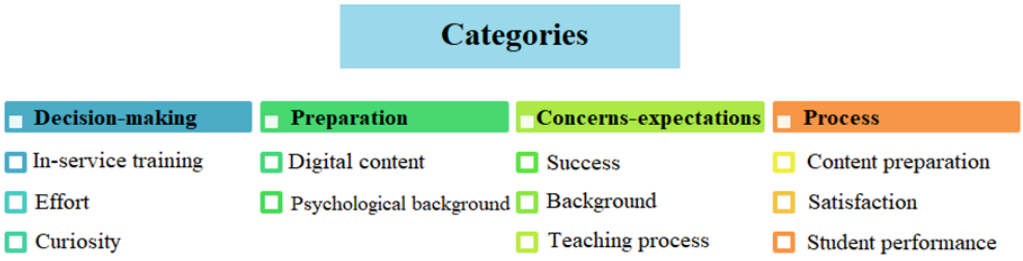


**Figure 4. Categories and codes obtained as a result of the analysis**

**Decision-making**

In this category, the decision-making process of the researcher-teacher about teaching using microlearning is discussed. Three codes were created under the decision-making category. These codes are as follows: in-service training, effort, and curiosity. The codes were analyzed one by one.

*In-service training*

The teacher highlighted in the diaries that the in-service trainings contributed to the preparation of digital content. She stated that following the trainings very carefully helped her a lot in this phase and that her curiosity in microlearning arose thanks to the trainings she received. A part of the interview conducted with the teacher is given below.

Researcher: Why did you want to teach using microlearning?

Teacher: Due to the COVID-19 pandemic, we received intensive in-service training provided by the Ministry of National Education in the periods when we transitioned to distance education. I discovered microlearning in the e-learning training I took during my winter break. It was based on digital content. I was interested in the subject, and I thought it could be used in mathematics. I started preparing digital content by gathering information from the internet. When I understood that it can be done, I decided that I could teach using this method.

As seen in the dialogue above, the teacher stated that she discovered microlearning thanks to the e-learning trainings she received. It is seen that the training she received had an effect on her ability to teach using microlearning.

*Effort*

This code presents the teacher's effort to create digital content after the knowledge acquired for micro learning. The teacher realized that she had difficulties in creating digital content at first, but then she was able to create more comprehensive content in a short time. When she reviewed the digital content she had prepared first in this process, she stated that she did not like the first drafts, but that she had to go through these stages to create good digital content. In one part of the diary, the researcher wrote, “To be frank, the Prezi presentation challenged me. It was a somewhat complex and demanding digital tool in its nature, but I was confident that I could overcome it.”, “I did not experience the difficulties I encountered in videos and presentations with Canva.” As can be seen from the diary sections, the teacher showed effort while preparing the digital content. A part of the interview conducted with the teacher is given below.

Researcher: Can you summarize your process to create digital content?

Teacher: After the training, I started creating digital content. I have to admit that it was difficult. However, I grasped the gist of micro learning once I was satisfied with the digital content I prepared recently.

As seen in the dialogue above, the teacher mentioned that the idea of teaching using micro learning started to grow on her after preparing digital content. It can be said that these experiences in the decision-making process are effective.

*Curiosity*

In the interviews, the teacher stated that she became curious after the trainings received and her own efforts. She stated that she thought “I wonder if mathematics can be taught using microlearning ?” She stated that this question led to other questions so that she developed a sense of curiosity towards micro learning. In the interviews and in her diaries, the teacher mentioned that she started thinking "How will micro learning affect the success of the students, how will it affect their performance, what will be the opinions of the students about this method..." She stated that she was curious about these subjects.

**Preparations**

This category presents the psychological states of the researcher-teacher and students before and during microlearning. The preparations category consists of 2 codes: digital contents and psychological preparations. Codes were analyzed one by one.

*Digital Content*

The teacher talked about the preparations she carried out for the application in her diaries. In the diaries, for the first week, the teacher wrote the following: “Web 2.0 tools to be used on the second day of the first week of the research were introduced to the students via smart boards. The interfaces of all Web.2 tools, their purpose of use, all visuals, the way and methods to be followed for design development were explained in general terms. A virtual classroom was created in the Microsoft Teams application and each student was assigned a class code. In line with the gradualism included in the general design of the research, the achievements have been added to the virtual classroom in a certain order, as various digital contents. It was emphasized that the students could access the content and learn anytime, anywhere, without limits. The added content was explained to the students through the WhatsApp group.” Similarly, she talked about the preparation stages of the digital content she prepared for the implementation process in the diaries. In another part of the diaries, she wrote: “I created an animated poster with Canva for the first achievement in the curriculum. The definitions and basic information in the first achievement were added to the worksheets, making it more interesting with the addition of animation.” As can be seen in this statement, the teacher made the necessary preparations to make the digital content more effective and interesting.

*Psychological Preparations*

The researcher-teacher tried to adapt herself and the students to this process before and during the application. In a part of the diaries, she wrote “Students were asked to not to prejudge and try adapting to the process. The excitement and curiosity of the students were obvious. They were also worried if it was going to be difficult. They had never been involved in any scientific research before and considered themselves as novices. Students constantly asked questions such as, Will the research be difficult or will we be challenged? It was obvious that they were faced with an experience they had never heard of or experienced before. The idea of research, digital tools, and virtual classrooms was very interesting to them. I tried to resolve their concerns by giving them detailed information about the process. It was also a very exciting and new development for me as well. At the same time, I would have had the experience and opportunity to fully use the Web.2 tools that I would introduce to them. For me, this was the start of increasing my technological and pedagogical content knowledge and keeping up with the digital transformation in education.” In this statement, the teacher talked about the psychological state of the students and herself in the application process. As it is seen, the teacher is as excited and curious as the students. A part of the interview conducted with the teacher is given below.

Researcher: Can you talk about your teaching process?

Teacher: …The effect of even a week in practice on me and the curiosity it aroused in students was incredible. Both the students and I were so excited and curious that I think this had a very positive effect on the implementation process because we take our work very seriously. By informing students at every stage of the process, I prepared them for microlearning.

As seen in the dialogue above, the teacher attributed the excitement in the students and herself to the fact that they took the implementation seriously. She stated that this situation is positive for the study. She mentioned that she provided information at every stage of the application to prepare the students for the microlearning process.

**Concerns and Expectations**

This category presents the researcher-teacher's concerns and expectations regarding the microlearning process. The concerns and expectations category was grouped under three codes as achievement, background, and teaching process. Codes were analyzed one by one.

*Success*

In the interviews conducted with the researcher-teacher and in the diaries she wrote, she talked about the expectations about the success of the lesson. In a part of the diaries, the teacher wrote “Students became aware of microlearning and began to like the process and understand that small information, short content that would not distract their attention, actually facilitated their learning. This reduced my anxiety about their success.” As can be seen in this section, the teacher had a concern about the success of teaching using microlearning. In a part of the diaries, the researcher-teacher wrote, “I was curiously waiting for the positive cognitive and affective characteristics that I observed informally in students to be realized in real life.” As can be seen from this section, the teacher had cognitive and affective expectations for teaching using microlearning. Since it was a different experience for both the teacher and the students, in the first days, the teacher was uneasy since there was a risk of students not understanding the lesson delivered using this method. However, as it can be understood from the chapter in the diary, she observed that the students internalized this method and stated that it facilitated their learning. The concern of the method not being successful that the teacher experienced at the beginning of the implementation was resolved by her observations. Thus, the failure concern was replaced by the expectation of success.

*Background*

The teacher was concerned about using the Internet and digital tools from the beginning of the implementation. She wrote her concerns about students accessing digital tools in her diary. The teacher wrote the following in her diary: “I asked whether there are technical problems to the students, whether they have Internet access and the necessary digital tools. The research started since there were no issues.”, and “On the first day of the third week, I first asked the students how the two-week process was for them. I examined whether they encountered technical problems and whether they had problems accessing digital content”. The teacher monitored the students' status of accessing the content from the beginning to the end of the implementation and completed the process without any problems. However, she had concerns about students having problems throughout the process.

*Teaching Process*

The teacher was concerned about the preparation and the teaching as well. The teacher was concerned about the students being able to adapt, adopting this teaching method, lessons being interesting, and the students not getting bored during the three-week process. The teacher wrote in her diary the following: “On the first day of the second week, I first asked the students what the first week meant to them, and whether they liked the implementation. I can say that I received positive feedback in general.”, and on the first day of the third week, I first asked the students how the two-week process was for them. A part of the interview conducted with the teacher is given below.

Researcher: How was the implementation process?

Teacher: I was stressed about the implementation, actually. I was worried about the students liking this method, and being able to follow the digital content, and the method being interesting for them, but my concerns were unfounded. I was surprised by the fact that the students adapted to the process quickly, and their visible interest, and increased my expectations towards the end of the process.

As it can be seen from the dialog, the teacher had concerns about the teaching process. However, she stated that her concerns were unfounded and the students liked the teaching process, and that they were interested in the subject-matter.

**Process**

This category presents the status of the teacher and the students in the microlearning process. The content preparation, satisfaction, and student performance codes were grouped under this category. The codes were analyzed one by one.

*Content preparation*

The researcher-teacher stated the difference in preparing the digital content towards the end of the implementation process. The teacher wrote in her diary the following: “We were about to complete the research. All the achievements regarding the ratio topic in mathematics were uploaded in the digital classroom. I prepared a Prezi presentation about the topic. It was a 3.5-minute presentation that explained the topic of ratio in general, with all the achievements and with different examples, in my own voice. I wanted to give them general information, exercise and I wanted them to be able to review the topic. I informed the students about the contents in the WhatsApp group. I asked my students to prepare a one-sentence slogan to see the conceptual learning of my students.”, and “On the last day of the research, I wanted to provide a general assessment of the whole topic of ratio. For this, I prepared a mini quiz using Google Forms, students stated that they liked it very much. I stated that they had to solve it in 3 minutes in total. I added a mini quiz and a general assessment quiz, a fun lecture video, and the end-of-the-topic logo to the Padlet digital board.” As can be seen, in the last days of the research, the teacher preferred to prepare more compelling digital content for the subject. The digital contents she created differ from those at the beginning of the process. Towards the end of the implementation, she focused on reviews, quizzes and more general content.

*Satisfaction*

Towards the end of the implementation, the teacher stated in the diaries and in the interview that the implementation process went very well both for the students and for herselt. In a part of the diary she wrote the following: “Today was the last day of the

research. It was difficult at some points, but overall I was happy that we had a nice and different learning experience. We mutually stated that the research was satisfactory." A part of the interview conducted with the teacher is given below.

Researcher: Do you have anything to add regarding the implementation?

Teacher: … The students and myself were happy by the end of the research. We had a different experience and we were happy about it. This experience was incredible. The students stated that they liked this method very much, and I was happy because they were happy.

As can be seen in the dialogue above, the teachers and students happily completed the teaching process at the end of the research. It was a different experience for both parties and they were happy that they completed this process together without any problems. Thus, at the end of the implementation process, both parties were satisfied with the completion of the research.

*Student performance*

The researcher-teacher stated that the microlearning process increased students' interest and attention towards digital learning. The teacher wrote the following in her diary: "I told the students that they could create their own digital content if they wanted to. My students designed their own mind maps using the MindMeister Web 2.0 tool. I was very happy that they showed interest, took the time to create their own digital content and provided this positive feedback. Also, some of my students made their own lecture videos. After checking these, I added them to the virtual class. I was also happy to receive such good feedback." It was a positive outcome for the study that students created their own digital content at the end of the microlearning process. It can be said that the e-learning process increases students' interest in digital learning.

## DISCUSSION AND CONCLUSION

Based on the findings obtained within the scope of the research, it was seen that the first factor in the decision of the researcher-teacher, who teaches using micro learning in the mathematics lesson, to use microlearning is based on the in-service training she received. At the same time, it was seen that the trainings received improved the sense of curiosity in the teacher and was effective in trying to create digital content. The researcher-teacher stated that she gained information about e-learning during the in-service training she received and that she found micro learning interesting. This shows that the training given to the teachers has an important connection with the methods and strategies they apply in the classroom. It can be said that the trainings received is a source of inspiration for professional development activities or at least they can spark some ideas. Harris and Sass (2011) stated in their study that in-service vocational training has significant effects on only secondary and high school mathematics, and that teachers' experiences increase their productivity (Harris & Sass, 2011). In the study, the researcher-teacher is a mathematics teacher and thanks to the in-service training she received, she gained information about e-learning and found micro learning interesting. In other words, one of the important factors in deciding to teach mathematics using micro learning was due to the in-service training she received. Some similar studies revealed that the teacher's practices in the classroom are positively affected by the increased knowledge of in-service training (Garet et al., 2008; Garet et al., 2010). These results are consistent with the research findings.

The teacher did not mention the point of creating micro content (dividing the subject into small parts) for mathematics in diaries. This may be an indication that she did not have any difficulties in separating the mathematics subject she chose into micro-contents. However, she expressed some of the difficulties she experienced when she converted micro content into digital content. Despite this, the researcher-teacher prepared digital content using many Web 2.0 tools while teaching micro learning. It was seen that the teacher's efforts to prepare digital content were successful and that she created digital content alone with the help of the internet. It is known that teaching environments using digital content provide more effective and efficient learning (Friesen et al., 2001). Similarly, (MoNE), (2018) Mathematics Curriculum (Primary and Secondary Schools 1, 2, 3, 4, 5, 6, 7 and 8$^{th}$ Grades) expressed that ICT competence, one of the eight key competences determined in the Turkish Qualifications Framework (TQF), is important. In this context, the study is important for the ICT competence of both teachers and students. In addition, many international organizations (European Union Parliament, 2006; Organization for Economic Co-operation and Development [OECD], 2019) have emphasized the importance of ICT competence and teachers are the most important examples in enabling the individuals to gain digital competence (Cuban & Jandric, 2015; Redecker, 2017). In this context, it is thought that the study is a guiding experience and resource for mathematics teachers who want to prepare lessons for micro learning, and enables the transformation.

It can be said that the researcher-teacher's design of digital content in the course and the designs increased her capacity for digitalization. The teacher did not give up on the Web 2.0 design tools that she had difficulties with, and created digital contents, and it seems that she got used to these digital contents towards the end of the process. So much so that in the last week of the micro-teaching application, she guided students by thinking that they could also create digital content. Thus, students were also involved in the digital content preparation process. Students created their own digital content and the teacher uploaded them to the virtual classroom. This may be an indication that the type of resources that the teacher uses in the lessons affect the student as well. Different researchers also emphasized that the materials used by teachers have effects on students, such as active participation in the process, facilitating learning how to access information and problem-solving skills, and increasing interest for the lesson (Dağhan et al., 2017; Kablan et al., 2013). Web 2.0 tools, which are especially important for 21$^{st}$ century learners, were used in the research. Learning using mobile devices was supported by the digital content prepared. As the highlight of the research,

it was highlighted that efficient learning would take place by integrating and combining the information obtained from different sources, and that the learners should be encouraged to be innovative and productive individuals (Jan, 2017; Tonta, 2009). Similarly, it is emphasized that access to information is important and mobile devices facilitate access to information (Siemens, 2005). The importance of learning integrated into daily life using internet technology is an undeniable fact (Hwang et al., 2008). Similarly, in the research, it was determined that learning realized independently of time and place in the digital environment with different Web 2.0 tools, revealed positive results for students.

It was seen that the researcher-teacher was concerned about the micro learning process, at the beginning but the concerns were solved as the implementation process was going on. The teacher was also concerned since it was her first time using those tools. The increase in the teacher's expectations towards the end of the implementation indicated that she would not be so concerned in the next micro learning experience. In this sense, it can be said that it is normal for teachers who want to teach using micro learning to be concerned at the beginning of the process, but these concerns will decrease as the process progresses.

Researcher-teacher and the students were very satisfied with the micro learning experience at the end of the process. In addition, the teacher stated that the students adapt easily to the process and that micro learning enables students to learn easier using simple content and factoids without being distracted. Thus, she stated that she believes micro learning contributes to the increasing success of the students. This is in line with the nature of microlearning, because micro learning includes simple narrowed topics and facilitates learning (Jomah et al, 2016). In addition, micro learning increases student satisfaction and motivation (Nikou & Economdies, 2018). With the research, it has been seen that micro learning can be used in mathematics lessons in accordance with its nature.

## RECOMMENDATIONS

Several suggestions based on the findings and results obtained in the research will be made for the teachers and those who will conduct research in the future. In this context, it can be suggested that micro learning and micro-contents can be integrated into mathematics and other courses. Micro-contents prepared using Web 2.0 tools were used in the research, but the contents can be enriched using different internet-based applications. Correlational studies can be conducted to reveal the role between teachers' ICT skills and microlearning. Thanks to this study, teachers in mathematics or different branches can design their lessons based on micro learning for post-Covid-19. By eliminating the limitations of the research stated below, comprehensive research of qualitative, quantitative or mixed type can be conducted with more participants. Considering the limitation of using only researcher diaries in the current study, it is suggested that students or other professionals in teaching could also keep a diary.

### Limitations of the research

The current research has its limitations. First, we chose to study one teacher in this study. This is a conscious choice as we wanted to delve deeper into teacher experience, especially in teaching using micro learning. It was thought that studying more teachers would make it difficult to show the subjects that were difficult to detect. Working with a single teacher creates a generalizability problem. This context and the chosen mathematics teacher are not typical. Since the teacher received in-service training according to the education system in Turkey, pursuing a P.h.D., and has professional experience for a certain period of time, the results obtained should be discussed in a specific context.

Despite these limitations, it is thought that the study will help teachers who want to teach mathematics using micro learning in terms of being inspiring and providing resources.

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### Conflicts of Interest

The authors have no conflicts of interest to declare relevant to the content of this article.

### Ethical Procedures

All procedures performed in the present study was in accordance with the ethical standards of the Ethics Review Committee (ERC) of the Kilis 7 Aralık University.

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| Research Article / Araştırma Makalesi|

# Distance Learning During the COVID-19 Pandemic: What is Happening at Home?

# COVID-19 Salgını Sırasında Uzaktan Eğitim: Evde Neler Oluyor?

**Ahmet Akif ERBAŞ**[1]

**Keywords**

1. Distance education
2. Online learning
3. Primary school
4. COVID-19
5. Parent satisfaction

**Anahtar Kelimeler**

1. Uzaktan eğitim
2. Çevrimiçi öğrenme
3. İlkokul
4. COVID-19
5. Ebeveyn memnuniyeti

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## Abstract

*Purpose:* The purpose of the research is to reveal the status of distance education at home during the COVID-19 pandemic by consulting students and parents.

*Design/Methodology/Approach:* "Case study model", one of the qualitative research models, was used in the study. The study group consisted of 32 primary school students and 31 parents. Data were collected through interviews with parents and students. Content analysis was applied in the process of examining the student and parent interview recordings. The analysis of data was done using the NVivo qualitative analysis program.

*Findings:* The answers of students and parent were grouped under six main themes as; "Educational Process, Family Support, School, Roots of the Problems, School or Distance Education?, Request-Suggestion".

*Highlights:* Distance learning devices and rooms are shared or used alternately when there is more than one student at home. It is understood that the responsibilities of parents on the education of their children have increased during the distance education process and this situation also puts a strain on the parents. During the distance education process it has been understood that problem in accessing (Education Information Network) EBA and disconnecting from EBA and Zoom during the lesson, not being able to enter the system due to the high number of users logged in at the same time, video and sound problems and lack of technological equipment.

## Öz

*Çalışmanın amacı:* Araştırmanın amacı; COVID-19 salgını sürecinde ilkokullardaki uzaktan eğitimin durumunu öğrenci ve veli görüşlerine başvurarak ortaya koymaktır.

*Materyal ve Yöntem:* Araştırmada nitel araştırma modellerinden ''durum çalışması modeli'' kullanılmıştır. Çalışma grubu 32 ilkokul öğrencisi ve 31 veliden oluşmaktadır. Veriler veli ve öğrencilerle yapılan görüşmeler yoluyla toplanmıştır. Öğrenci ve veli görüşme kayıtlarının incelenmesi sürecinde içerik analizi uygulanmıştır. Verilerin analizi NVivo nitel analiz programı kullanılarak yapılmıştır.

*Bulgular:* Öğrencilerin ve velilerin cevapları; "Eğitim Süreci, Aile Desteği, Okul, Sorunların Kaynakları, Okul mu Uzaktan Eğitim mi?, İstek-Öneri" olmak üzere altı ana tema altında toplanmıştır.

*Önemli Vurgular:* Evde birden fazla öğrenci olduğunda odalar paylaşılmakta veya dönüşümlü kullanılmaktadır. Uzaktan eğitim sürecinde velilerin çocuklarının eğitimi üzerindeki sorumluluklarının arttığı ve bu durumun velileri de zorladığı anlaşılmaktadır. Uzaktan eğitim sürecinde en çok internetin çekmemesi veya kopması, EBA'ya erişememe, ders esnasında EBA (Eğitim Bilişim Ağı) ve Zoom'da yaşanan kopmalar, yoğunluktan dolayı sisteme girememe, görüntü ve ses bozukluğu, teknolojik araç-gereç eksikliği gibi problemler yaşandığı anlaşılmaktadır.

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## INTRODUCTION

Distance education processes in the world have come up today as supportive of traditional education or as an alternative to traditional education. However, due to the COVID-19 pandemic, which started in China at the end of 2019 and affected the whole world in 2020, distance education became a necessity, not an option, when schools were closed. The World Health Organization (WHO) declared the COVID-19 as a "Pandemic" on March 11, 2020. The pandemic affected the whole world in terms of education as well as health, economic, political and social aspects. In this context, the idea of closing schools to reduce the spread of the pandemic has been implemented worldwide (UNESCO, 2020; UNICEF, 2020).

The education of students suffered cuts all over the world together with the closure of schools, so the education system in Türkiye was also affected by this situation. The total number of students affected by the interruption of education has been about 26 million in Türkiye and the number of students affected at primary and secondary levels were about 18 million (Higher Education Council, 2020; Ministry of Education, 2020a). Along with the closure of schools, distance education activities have been put to work to ensure the continuity of education in Türkiye.

In this process, schools were first closed on March 16, 2020 in Türkiye. Schools were not attended in any ways during the times when they were closed. Within the scope of face-to-face and distance education practices at primary, secondary and high school levels, it has been decided to continue education through 3 TV channels (TRT EBA TV) and Education Information Network (EBA) (Ministry of Education, 2020b). EBA is an interactive education site used by the Ministry of Education in the distance education process. In this process, it was decided to provide gradual and diluted face-to-face education at some grades (preschool, 1, 2, 3, 4, 8, 12th grades). During this period when schools were closed, including the practices of face-to-face education, students continued their education through distance education. Within the scope of the education provided by TRT EBA TV channels, lecture broadcasts for primary, secondary and high schools last all day, with an average of 25 minutes per lesson (EBA, 2020). In this context, a total of 1000 volunteer teachers from 112 different branches took part in the preparation of course publications. In this process, approximately 9,000 lecture videos were prepared for broadcast, while 722 extracurricular activity videos were made available to students (Ministry of Education, 2020c). At the same time, teachers continued their live lessons with their students through platforms such as Zoom, Skype, WhatsApp, Microsoft Teams, as well as TRT EBA TV and EBA system.

The Ministry of National Education, teachers, students, parents and all stakeholders have endeavor to carry out distance education processes with maximum efficiency. However, distance education also has some limitations as well as many useful aspects for teachers and students. The important thing is to follow how this process works and reveal the problems experienced by students and parents in the distance education process. Identifying the problems experienced in the distance education process and developing solutions quickly will help the process to proceed properly. Determining the technical problems experienced in the distance education process, the problems caused by the school administration, teachers, parents and students and developing solutions in this direction will contribute to the improvement of the distance education infrastructure and distance education processes.

When the literature is examined, one can see that studies have been done on the attitudes of academicians, teachers, teacher candidates, students and parents towards distance education (Kocayiğit & Uşun, 2020; Moçoşoğlu & Kaya, 2020; Yıldız, Çengel & Alkan; 2021) and the opinions of education stakeholders on the functioning of distance education (Bakioğlu & Çevik, 2020; Gören et al., 2020; Karakuş et al., 2020; Kaynar et al., 2020; Keskin & Özer Kaya, 2020; Öz Ceviz et al., 2020; Serçemeli & Kurnaz, 2020; Şeren et al., 2020; Tarlakazan & Tarlakazan, 2020; Yurtbakan & Akyıldız, 2020), the problems encountered in the distance education process (Erzen & Ceylan, 2020; Gök & Akcan, 2022), the effectiveness of distance education (Başaran et al., 2020), disadvantaged groups in the distance education process (Sirem & Baş, 2020), the suitability of the education programs for distance education (Koç, 2021), EBA activities in the distance education process (Doğan & Koçak, 2020), steps taken by the Ministry of Education in the distance education process (Özer, 2020a), vocational and technical education in the distance education process (Özer, 2020b).

Many researchers showed rapid reflexes and conducted research on the state of distance education during the COVID-19 pandemic. However, because the process is quite dynamic and variable and to reveal the situation of distance education at home new research is always needed. One of these dimensions is what is the status of home education processes during the distance education period? When the studies are examined, few studies have been found that reveal the situation of distance education at home. At the same time, studies on the determination of the problems experienced by students and parents are also limited. In this respect, it is thought that our study will fill the gap in the field.

For the first time, many unexperienced issues have come to light as the education-teaching processes continue from home using completely distance education methods. Especially for parents and children, this process has presented a very different situation. More than ever before, parents have assumed the role of teachers. Students set up the classroom environment through online tools without their teachers and friends. Students who started the first grade of primary school continued their school life for a long time without seeing their classes, teachers and friends. Students continued most of the pandemic process with distance education processes from home.

In this context, the purpose of the research is to reveal the status of distance education at home during the COVID-19 pandemic by consulting students and parents. For this purpose, answers to the following questions were sought in the study:

1. What are the opinions of primary school students regarding the distance education activities implemented during the COVID-19 pandemic?
2. What are the parents' opinions regarding the distance education activities implemented during the COVID-19 pandemic?

## METHOD/MATERIALS

This research is a qualitative study that aims to reveal the status of distance education at home during the COVID-19 pandemic. "Case study model", one of the qualitative research models, was used in the study. Case study is a method in which one or more events, individual, setting, program, social group or other interconnected systems are examined in depth in their natural context (McMillan, 2008). Since there is more than one unit of analysis selected in the study, 'nested multiple case pattern' was used among case study designs (Yıldırım & Şimşek, 2013).

### Study Group

32 primary school students studying in Türkiye's province of Zonguldak and 31 parents who have students at primary school constitute the study group. The people in the study group do not have kinship relations. The reason for this preference is to reach more information about different home environments. Participants in the study group were selected on a voluntary basis. At the stage of determining the students and parents to be interviewed, the maximum diversity sampling method, one of the purposeful sampling methods, was used. While determining the sample, it was tried to diversify the characteristics of the people as much as possible. Students were selected from 9 different primary schools. Parents were selected from 11 different primary schools. In the selection of students and parents, it is aimed that the numbers of male and female are close to each other. Information on the demographic characteristics of the participants in the study is presented in Table 1.

**Table 1: Number of Students and Parents Interviewed**

| | Students | | Parents | |
|---|---|---|---|---|
| Grade level | Male | Female | Male | Female |
| 1th grade | 4 | 5 | 6 | 2 |
| 2th grade | 4 | 3 | 4 | 3 |
| 3th grade | 6 | 3 | 6 | 2 |
| 4th grade | 4 | 3 | 5 | 3 |
| Total | 32 | | 31 | |

### Data Collection Tools

#### Parent-student interview form

A semi-structured interview forms was prepared by the researcher to collect interview data. Separate forms have been developed for both parents and students (Appendix-1, Appendix-2). With the help of this forms, it is aimed to get the opinions of students and parents about the status of distance education at home during the COVID-19 pandemic. During the development of student and parent interview forms, a question pool was created by examining the literature first. Then, the questions were studied and the final version of the interview forms was obtained by taking expert opinions. While creating the forms, the opinions of two academicians (1 Asst. Prof. Dr, 1 Dr.) working in the field of classroom education was consulted. The forms consist of two parts. In the first part, there is demographic information of students and parents, and in the second part, there are 7 different open-ended questions for students and parents about distance education processes. For the pilot application of the interview forms, interviews were held with 3 students and 3 parents, and it was tested whether the questions were understood correctly and whether they were suitable for the purpose of the research.

#### Voice recordings

The researcher tried to prevent data loss and increase the validity and reliability by recording the interviews with students and parents with a voice recorder during the data collection process. The sound recordings were made with the consent permission of the participants.

### Data Collection

The research data were collected by the researcher through interviews with parents and students during the 2020-2021 fall semester. Using the semi-structured interview method in the study, interviews about the status of distance education processes were done with primary school students and the parents who have students in primary school by using telephone and online tools. During the interviews, the interviews were recorded with a tape recorder with the permission of the participants. The data obtained as a result of the interviews were classified using computer and made ready to be analyzed.

## Data Analysis

Content analysis was used in the process of examining the student and parent interview recordings. The analysis of the interview data was done using the NVivo qualitative analysis program. Within this framework, firstly, data sets were read with an inductive approach and then they were codified. After coding, themes were created and reliability and validity were tried to be increased by checking codes and themes.

## Validity and Reliability

The researcher transcribed the voice recordings twice in order to ensure the accuracy and reliability of the data sets. In addition, accuracy of voice recordings were listened to and checked by a graduate student. The researcher made the content analysis by spreading the process to a longer period and repeating this process to ensure coding accuracy and reliability. At the same time, the researcher tried to increase the code and theme accuracy by constantly checking the codes and the themes. In addition, the accuracy and reliability of the codes and themes created were tried to be increased by obtaining expert opinions. The expert, whose opinion was taken, works in the education faculty of a state university in Türkiye. The percentage of agreement between the encoders for the interview data was calculated as %87.83. Considering the data obtained, it is seen that the percentage of agreement is at a valid level (Miles & Huberman, 1994). The author has declared that he complies with all ethical rules. Ethical permission was obtained for this research from the Human Research Ethics Committee of Zonguldak Bülent Ecevit University (10/11/2020-916).

# FINDINGS

## Findings Regarding the Interviews with the Students

The answers given by the students to the interview questions were analyzed and the findings obtained were presented under this heading. As can be seen in Figure 1; 'Education Process, Family Support, School, the Roots of the Problems, School or Distance Education?, Request-Suggestion' the data are grouped under six main themes according to the analyses done.

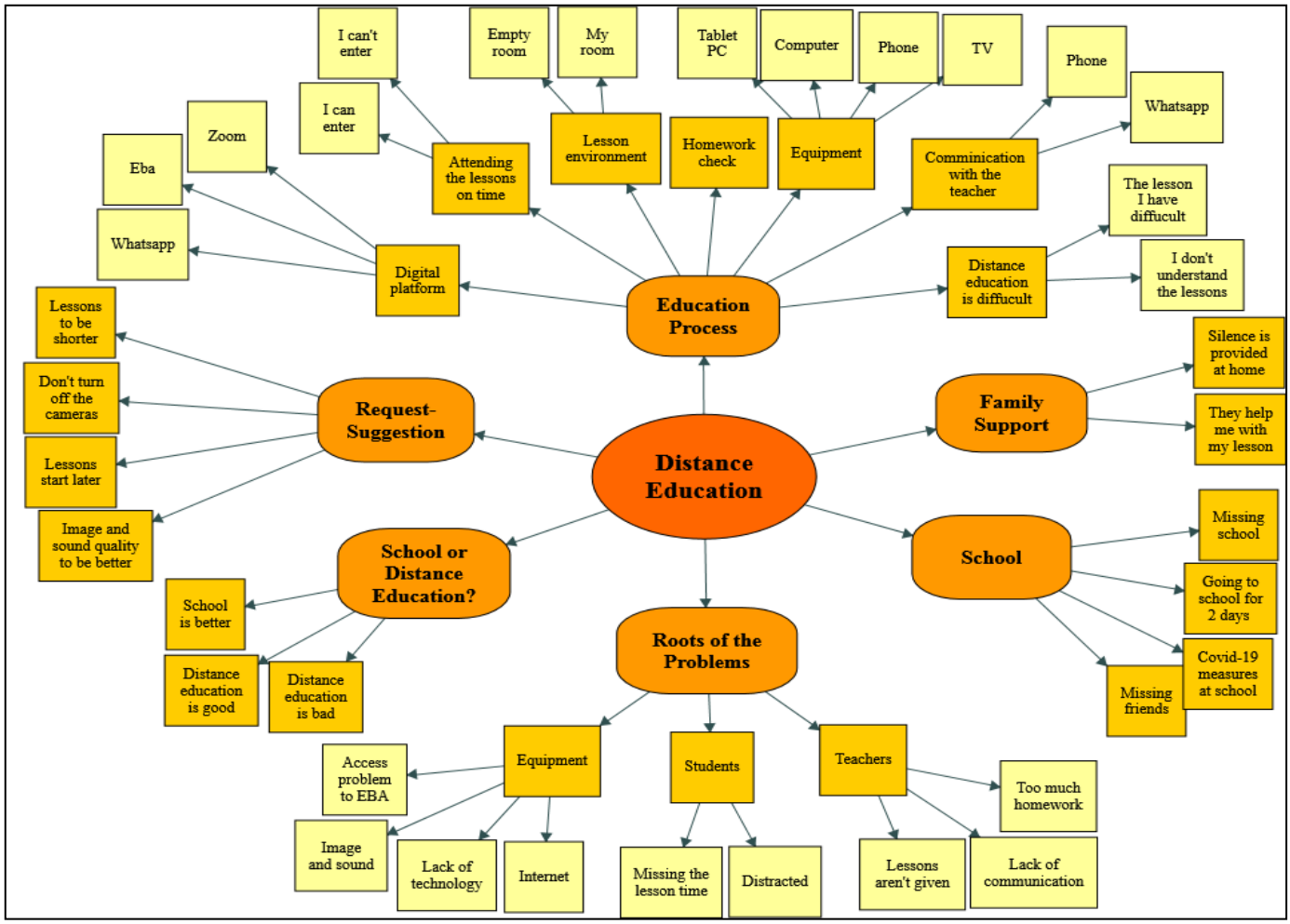


**Figure 1. Themes and Sub-Themes Created According to Students' Answers**

Interviewed students stated that they accessed the courses in the distance education process by using platforms such as TRT EBA TV, EBA, Zoom, Whatsapp regarding the sub-theme of 'digital platform'. Interviewed students stated that they were able to

attend their classes on time with the support of their families during the distance education process regarding the sub-theme of 'on time course entry'. Some students, on the other hand, stated that they could not attend the classes on time due to reasons such as forgetting the time of the lesson, falling asleep, and internet and infrastructure problems. Interviewed students stated that they sometimes give their lessons in their own rooms and sometimes in an empty room, depending on the conditions of the home environment, regarding the sub-theme of the 'lesson environment'. Interviewed students stated that they sent their homework to their teachers via platforms such as Whatsapp and Zoom regarding the 'homework check' sub-theme. The students who were interviewed regarding the sub-theme of 'equipment' stated that they had access to their lessons in the distance education process via computer, phone, tablet and TV. Interviewed students stated that they communicated with their teachers over the phone and Whatsapp application regarding the sub-theme of 'communication with the teacher'. Interviewed students stated that they had difficulties in courses such as Mathematics, English, Life Sciences, and Science in the distance education process related to the sub-theme of 'difficult distance education'. In this context, the students' views are as follows:

S5: ''…The most difficult lesson for me is English…''

S11: ''…The teacher assign homework on Whatsapp and we show it to the teacher on Zoom…''

S16: ''…My brother is very young; he cries a lot. That's why I go to the living room and close the door. I listen to my teacher on the sofa…''

S18: ''…I attend EBA TV on television and live lessons on my tablet…''

S21: ''…Yes, my mother wakes me up, I can attend at 9-10…''

S24: ''…During the pandemic, the teacher sends photos on Whatsapp and we do it from there…''

S25: ''…I am using my mother's phone. I have no other devices other than that…''

Family Support Theme, 'silence is provided at home' and 'they help me with my lessons' subthemes were included. Regarding the sub-theme 'silence is maintained at home', the interviewed students stated that they attend the classes in a quiet environment in order not to be distracted during class times, and they said that family members turn off the television during class time and ensure silence at home. Interviewed students stated that they received support from their family members regarding the sub-theme 'they help with my lessons' during the distance education process, at points they could not understand about their lessons and for their homework. In this context, the students' views are as follows:

S4: ''…They help. The television is turned off…''

S13: ''…Quietly, my mother knocks the door and enters. But she doesn't make any noise…''

S18: ''…I am doing my homework with my father. I only do homework with my mom on Thursdays…''

Within the School Theme, the sub-themes of 'missing friends, missing school, going to school for 2 days, COVID-19 measures at school' were included. Regarding the sub-theme of 'longing for friends', the interviewed students stated that they missed their friends during the distance education process, they had a good time playing games at school, and they were bored because they could not reach them. Interviewed students stated that they miss school and want to go to school regarding the sub-theme of 'longing for school'. Interviewed students stated that they went to school during the period when most of the schools were partially opened regarding the sub-theme of 'going to school for 2 days'. Interviewed students said that, regarding the sub-theme of 'COVID-19 measures at school', mask, distance and cleaning rules are generally observed at the school entrance and during their stay at the school, however, some students do not follow the rules. In this context, the students' views are as follows:

S16: ''…I want to go to school, I used to have a good time with my friends, but now I am very sorry that the schools are closed…''

S17: ''…Sometimes I get bored when I don't have friends around. After I finish my homework, I think about the school. I cannot spare the time we played for myself…''

S19: ''…Going to school made me very happy. Seeing my teacher and my friends two days a week makes me happier…''

S20: ''…I would like to go to school for more days…''

S27: ''…We played distant games. Distant games, without touching each other…''

Within the Roots of the Problems Theme, sub-themes of 'equipment, students and teachers' were included. Interviewed students stated that they had problems related to the sub-theme of 'tools and equipment', such as the problem of not receiving the internet during the distance education process, EBA being kicked out of the system, visual and sound disorders, not being able to enter the system due to busyness, and lack of technological tools and equipment. The interviewed students stated that they forgot to attend the classes, missed the classes because they fell asleep, and could not attend the class on time regarding the sub-theme of 'student'. Interviewed students stated that they could not communicate with their teachers, teachers gave a lot of homework, and their teachers made the live lesson very short or not. In this context, the students' views are as follows:

S9: ''…I have difficulties in doing and handing in all my homework because teachers send too much homework…''

S19: ''…Internet cuts out sometimes. For example, EBA is sometimes not accessible. The system logs us out a lot…''

S25: ''…I could not attend classes because I did not have a computer or a tablet and I fell behind…''

S27: ''…I want my friends not to make a noise in distance education. When they do so, I do not understand the topics…''

Within School or Distance Education? Theme, sub-themes of 'school is better, distance education is good, distance education is bad' were included. Interviewed students stated that the school is better because of the sub-theme 'school is better' because they can better understand the lessons at school and their communication with their teachers is easy. Interviewed students stated that distance education is good, their friends do not comply with pandemic rules, and they support distance education by stating that there is a risk of transmission of the disease regarding the sub-theme of 'distance education is good'. Interviewed students stated that distance education is bad by saying that they are bored in distance education, they do not like to teach in distance education, and they do not understand anything about the sub-theme of 'bad distance education'. In this context, the students' views are as follows:

S5: ''…It is too bad and what I found there was boredom…''

S9: ''…I think it is nice. Because when we are face to face, the virus can be transmitted to us…''

S21: ''…I think the school is better than connecting on Zoom. After all, we could see our friends then…''

S27: ''…It is much better when we are at school. We take turns by raising hands. Then we understand subjects better. We cannot take turns in distance education…''

Regarding the Request-Suggestion Theme, the interviewed students want the cameras not to be turned off during the distance education process, shorter live lesson durations, lessons starting later, and better image and sound quality. In this context, the students' views are as follows:

S5: ''…They should take the lessons to a later time…''

S13: ''…I would like the lessons to be shortened…''

S29: ''…I think the cameras and sound in distance education should always be on. Because some students never respond. There are very few people who participate…''

### Findings Regarding the Interviews with the Parents

The answers given by the parents to the interview questions were analyzed and the findings obtained were presented under this heading. As can be seen in Figure 2 'Education Process, Family Support, School, the Roots of the Problems, School or Distance Education?, Request-Suggestions, the data are grouped under six main themes according to the analyses done.

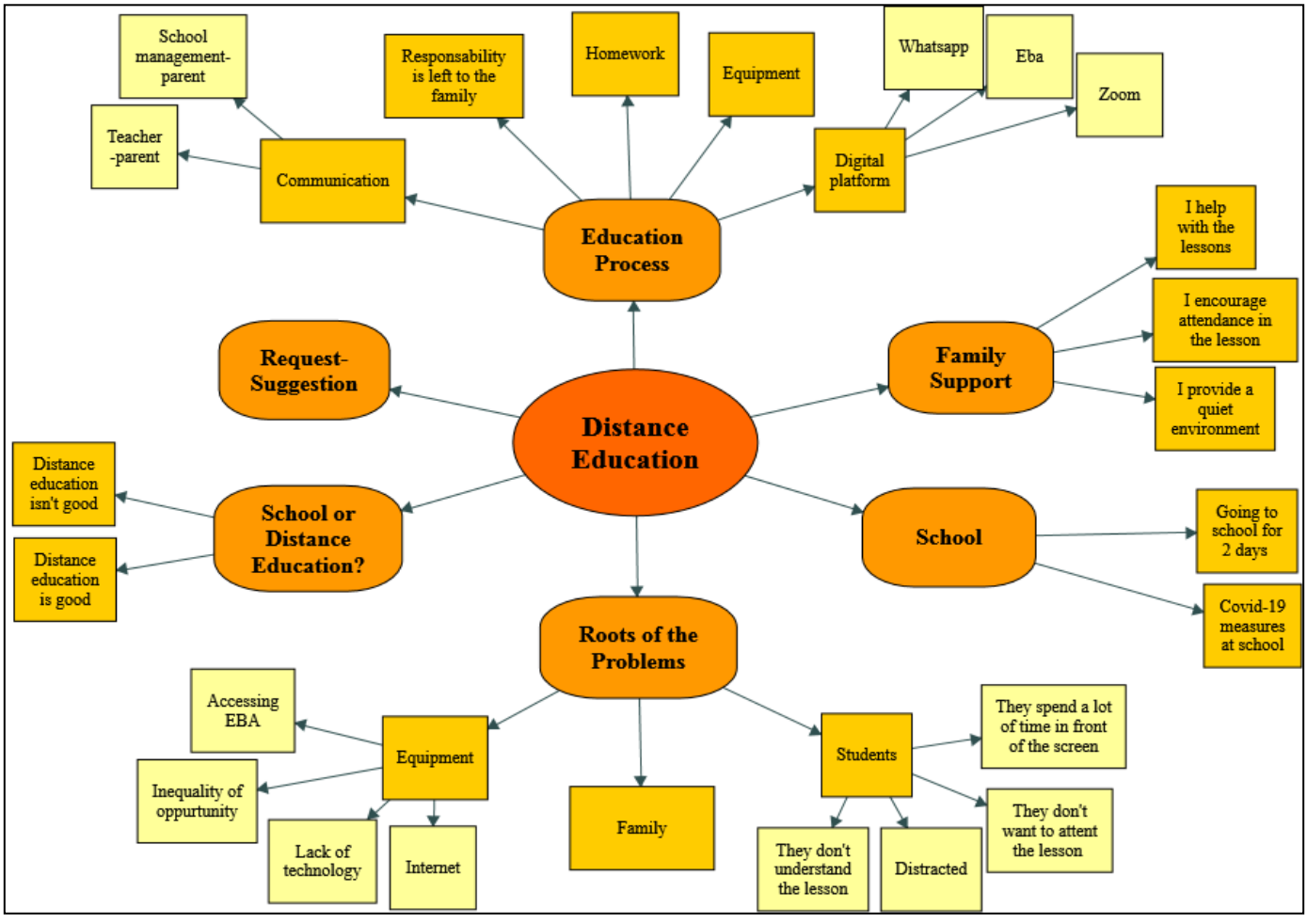


**Figure 2. Themes and Sub-Themes Created According to Parents' Answers**

Within the Education Process Theme, 'communication, responsibility is left to the family, homework, digital platform, equipment' sub-themes were included. The interviewed parents stated that the school administration did not communicate with them regarding the sub-theme of 'communication', while some stated that the school administration communicated with them. It is stated that teacher-parent communication is generally good in the distance education process. Interviewed parents, regarding the sub-theme of 'responsibility' is left to the family, stated that their responsibilities in the education of their children increased during the distance education process, and this situation puts a strain on the parents. The parents interviewed stated that regarding the sub-theme of 'homeworks', the teachers gave homework during the distance education process and the control of the homework was provided through the Whatsapp application. The interviewed parents stated that the sub-theme of 'digital platform', during the distance education process, the courses are held through platforms such as EBA, Zoom, Whatsapp. Interviewed parents stated that tools such as phones, computers, tablets and TVs are used in the distance education process regarding the sub-theme of 'equipment'. In this context, the parents' views are as follows:

P6: ''…We had to buy a computer because we had trouble with the phone…''

P7: ''…There was no communication regarding the distance education. Only the classroom teacher gave brief information. Our communication is carried out through the Whatsapp group…''

P19: ''…I am trying to be involved in this process since they do not have any teachers with them. But I cannot say that I am as good as a teacher…''

P18: ''…Too much homework is given. My child cannot keep up with the homework given by both EBA and the teacher. There should be a little bit of less homework maybe…''

P9: ''…We attend the lessons by phone, EBA or Zoom…''

The sub-themes of 'I encourage attendance in the lesson, I help with the lessons, I provide a quiet environment' were included in the Family Support Theme. Parents who were interviewed stated that, regarding the sub-theme I encourage attendance in the lesson, they follow the course hours, ensure that the students attend the course on time, monitor and motivate them to attend the courses in order to ensure their attendance during the distance education process. Interviewed parents stated that they try to help their children with their lessons, help with their homework, and buy reference books regarding the sub-theme 'I help with their lessons'. Parents who were interviewed stated that they try to provide a quiet environment to the students, even if they have difficulties in case of having more than one student at home, regarding the sub-theme 'I provide a quiet environment'. In this context, the parents' views are as follows:

P8: ''…We usually try to follow the lesson times and the course schedules. We try to check if he attends the lessons as much as possible…''

P12: ''…In the distance education process, we only have controls on how the homework is done, whether it is done correctly, and whether it is done or not…''

P15: ''…When my three children attended classes at the same time, it was a problem to locate them in the house. I was placing one of my child in the room, one at one end of the room and one at the other…''

'COVID-19 measures at school, going to school for 2 days' included in the School Theme. Interviewed parents stated that, regarding the sub-theme of 'COVID-19 measures at school', mask, distance and cleaning rules are generally observed during school entrances and exits and during their stay at school. Regarding the sub-theme of 'going to school for 2 days', some of the interviewed parents stated that they send their children to schools that are open 2 days a week because the school is more efficient and the children can acquire life skills at school better. In this context, the parents' views are as follows:

P2: ''…Parents were not allowed to enter the school. Disinfectant, masks, dividing the classes into two groups; these were implemented properly at school…''

P14: ''…I don't think education at home progresses very efficiently. Therefore, I think that our children should continue going to school by taking the necessary measures…''

Within the Roots of the Problem Theme, 'student, family and equipment' sub-themes were included. Interviewed parents, regarding the sub-theme of 'student', state that students cannot focus on their lessons and experience distraction during the distance education process. Interviewed parents stated that the lessons were inefficient due to the indifferent family attitude regarding the sub-theme of 'family'. Interviewed parents stated that they encountered problems related to the sub-theme of equipment, such as internet disconnection or disconnection during the distance education process, problems in accessing EBA, and disconnections in EBA and Zoom during the lesson. In this context, the parents' views are as follows:

P1: ''…He cannot focus too much on lessons, study or get much efficiency…''

P4: ''…I currently have a computer and a tablet at my house. I do not have a problem with that. But there are children who can't have them. They need to make necessary arrangements to make these available…''

P6: ''…Since I am concerned, I want other parents to be concerned as well. Because some children are constantly on the move at home. They are constantly asking questions that do not relate to the lesson content to the teacher…''

P25: ''…In this distance education process, children have become screen addicts. We encountered attention deficiency problems. The atmosphere in the house is not suitable for education…''

Within School or Distance Education? Theme, 'distance education is good' and 'distance education is not good' sub-themes were included. The interviewed parents have a positive approach to the distance education process regarding the sub-theme of 'distance education is good', because the distance education process keeps students away from illness, ensures that they do not fall behind in their lessons, and does not interrupt education-training. Parents who were interviewed stated that they encountered many difficulties in the courses in the distance education process regarding the sub-theme 'distance education is not good', that distance education is not effective and efficient, and that students do not accept distance education as education. In this context, the parents' views are as follows:

P3: ''…Let's say distance education is the best of the bad. The children could have completely fallen behind with the lessons. At least, the government is trying to give an education in an indirect way. That's nice if we think from that aspect…''

P18: ''…Frankly, I don't think distance education is efficient for children…''

Regarding the Request-Suggestion Theme, the interviewed parents want the cameras not to be turned off during the distance education process, shorter lesson times, late starting hours, better image and sound quality, more active teachers in live lessons, and making lessons more fun. At the same time, parents want the live lessons to be recorded in order to be able to watch the lessons again and the government and relevant institutions to support parents and students to achieve equality of opportunity. In this context, the parents' views are as follows:

P7: ''…I want teachers to be more active in live lessons. I think it will be more efficient this way…''

P16: ''…In order to make it efficient, I would like our government to provide tablet and computer facilities to children who cannot afford it…''

## DISCUSSION, CONCLUSION AND RECOMMENDATIONS

As a result of the interviews with the students and parents, it is understood that different devices (phones, computers, TV) and platforms (TRT EBA TV, EBA, Zoom, Whatsapp) are used in the distance education process. These devices are provided by the family and used jointly with other siblings. In the study conducted by Başaran et al. (2020), it was determined that if there is more than one student in a house, participation in the lessons is not completely done. The fact that families have technological equipment and infrastructure facilities also affects students' access to distance education. On the other hand, the use of different devices and platforms increases the flexibility and accessibility of distance education (Tarlakazan & Tarlakazan, 2020). Creating highly accessible education channels such as TRT EBA TV and using TVs that we can find in almost every house in this context are of great importance in terms of equal opportunity. As a matter of fact, Gören et al. (2020) determined that students accessed the lessons mostly via TRT EBA TV. In the pandemic process affecting the whole world, Türkiye has also implemented similar distance learning processes like other countries (Motiejunaite-Schulmeister & Crosier, 2020).

Depending on the conditions of the home environment, students sometimes attend their classes in their own rooms and sometimes in available rooms. When there is more than one student at home, the rooms are shared or used alternately. In general, it was determined that the home environment was tried to be made suitable for the students. However, as a result of the crowded Turkish family structure and the socio-economic conditions of the families, as families have more than one student at home and each student does not have their own room, families have found solutions for their students to participate in the lessons more easily. Kaynar et al. (2020) state that students who attend their lessons in their own room during the distance education process have more positive views on distance education compared to their peers who do not. In this context, it can be inferred that the home environment has effects on students' attitudes towards the distance education process.

It is understood that the responsibilities of parents on the education of their children have increased during the distance education process and this situation also puts a strain on the parents (Koç, 2021). In the distance education process, students receive support from their family members on subjects they cannot understand and with their homework. It is stated that students who receive support from their families in the distance education process have a more positive attitude towards learning, their tendency to learn subjects has increased and that family support increases students' self-efficacy (OECD, 2020a). Sun et al. (2020) stated that homework will contribute to the enhancement of students' self-discipline as well as reinforcing the knowledge acquired in the distance education process. At the same time, homework makes what students learn permanent. In this process, the homework given by the teachers and the support of the families are very important for primary school students to gain a context of duty and self-discipline.

Students had difficulties in their lessons during the distance education process. At the same time, 1st grade students have difficulty in reading and writing. In addition, it was concluded that some students could not understand the lessons, they were confused and could not get efficiency from the lessons. Similarly, Başaran et al. (2020) reveal that students have problems with their English lessons. Lessons in which communication in front of the screen is limited and held in an abstract environment challenge students who are in a concrete operational stage in terms of cognitive development stages. In this respect, the methods and materials used in the lessons should be diversified and concretized in a way that students can understand it better.

Students and parents stated they encountered problems such as internet cuts or disconnecting during the distance education, problems in accessing EBA and disconnecting from EBA and Zoom during the lesson, not being able to enter the system due to the high number of users logged in at the same time, video and sound problems and lack of technological equipment. In the literature, there are studies that support our findings (Bakioğlu & Çevik, 2020; Başaran et al., 2020; Bozkurt, 2020; Dikmen & Bahçeci, 2020;

Doğan & Koçak, 2020; Erzen & Ceylan, 2020; Gören et al., 2020; Karadağ & Yücel, 2020; Karakuş et al., 2020; Şeren et al., 2020; Tuncer & Bahadır, 2017). There is no physical contact between student and teacher, as distance education is carried out over the internet. This over-dependence on technology is a major disadvantage for distance education. In the event of any software or hardware failure, the lesson stops, which may disrupt the learning process (Sedeghi, 2019). This situation may negatively affect students' attitudes towards distance education and their academic success. As a matter of fact, there are findings that there is a decline in the success of students lacking infrastructure at home (Morgan, 2020; Carrillo & Flores, 2020). On the other hand, although there are problems experienced throughout the country, it has been stated that after the settlement of the system and the people getting used to the system, technical problems have decreased and the system is used more easily (Serçemeli & Kurnaz, 2020). In this context, minimizing the problems and making the system more usable is an important development for the distance education process.

Parents face problems such as students' inability to focus on their lessons, distraction, not wanting to attend the lesson and not being able to understand the lessons. In other studies of the literature, it has been determined that students' motivation in distance education is low (Bakioğlu & Çevik, 2020; Doğan & Koçak, 2020; Gören et al., 2020; Karakuş et al., 2020; Wheeler, 2002). Motivation is effective on studying and being interested in the lesson (Akbaba, 2006). In this context, the lack of motivation in the distance education process may have a negative effect on students' participation in class and involvement in class work. It is the responsibility of all education stakeholders to minimize this impact.

Parents stated that students were worried about being screen-addicted because they spend a lot of time in front of the screen. Families are of the opinion that increased interest in computer and tablet use will harm students (Sirem and Baş, 2020). It is stated that the time spent by students in front of social media and TV during the distance education process has doubled (Keskin & Özer Kaya, 2020). As the time spent in front of the screen and internet usage time increase, the risk of internet and screen addiction increases. When the literature is examined, it is seen that there are many studies supporting this result (Alaçam, 2012; Bayraktar, 2001; Doğan, 2013; Döner, 2011; Günüç, 2009; Kaya, 2011; Kır & Sulak, 2014; Şahin, 2011; Tutgun, 2009; Üçkardeş, 2010).

Most of the students and parents think that the school is more efficient than distance education. In the literature, there are studies that are in line with these results and show that the school is more efficient than distance education (Bozkurt, 2020; Doğan & Koçak 2020; Görgülü Arı & Hayır Kanat, 2020; Kaynar et al., 2020; Moçoşoğlu & Kaya, 2020; Yurtbakan & Akyıldız, 2020). Yıldız (2016) found in her study that students' attitudes towards distance education were moderate. Students' negative attitudes towards distance education can also affect their attitudes towards the lessons. In addition, there are some opinions that students' learning by doing-experiencing is limited in the distance education process and that the acquisitions remain at the level of comprehension (Doğan & Koçak, 2020). In this process, learning activities by doing and experiencing may be limited due to reasons such as students' inability to experience classroom atmosphere, not being able to communicate well with their teachers and friends and not being able to directly access course materials and activities. This situation can affect both students' attitudes and success.

On the other hand, there are also students and parents who find the distance education process good and efficient. In the study conducted by Başaran et al. (2020), distance education is seen as successful due to preventing interruption of education. In the studies of Balaman and Hanbay Tiryaki (2021), teachers see distance education not as an adequate and complete teaching method, but as a means for various reasons such as students' not staying away from the lesson, not taking a dislike of the educational environment and not getting into a vacation mood. The main purpose of distance education is to eliminate the conditions that cause disruptions in face-to-face education and time and space discrepancies. In this context, the distance education processes implemented during the pandemic process are very important for the continuity of education.

Some of the parents think that the state and relevant institutions should support parents and students in terms of equal opportunities. It is also revealed in other studies that students and parents have deficiencies in terms of equal opportunities (Doğan & Koçak, 2020). At the point of eliminating the inequality defined as digital divide by OECD (2001), Ministry of National Education carries out studies to make up for the shortcomings of students with the support of the relevant institutions of the state, private sector and non-governmental organizations. As of April 2021, to has delivered around 700,000 tablets with free internet to students for free in Türkiye (Ministry of Education, 2021a). In addition, around 15,000 mobile or built EBA Support Points have been established in order to meet the needs of students who lacks access to technological devices and the Internet across Türkiye (Ministry of Education, 2021b). Free internet service was provided by GSM operators to the parents of students who might have internet problems. It is understood that the disruptions and inequalities of opportunity experienced since March 2020, the date when distance education started, have been tried to be overcome with such measures by those institutions. Similar practices exist in different countries around the world (OECD, 2020b).

In line with the results of the research, it is possible to list the suggestions as follows:

1. Training can be given to students and teachers about the systems used in the distance education process.
2. Within the scope of equal opportunities, internet infrastructure can be developed for each family that experiences a digital divide and internet service can be delivered to families who experience problems. By providing computer-internet facilities to disadvantaged students, the participation of students in classes can be increased.
3. It can be ensured that distance education lessons are in the form of live lessons in which students are taught by their own teachers. These lessons can be recorded and shared with students so that they can be watched again later.

4. It can be ensured that the process continues successfully by diversifying the educational materials according to individual differences and needs.
5. In-depth studies can be conducted to determine the effects of the distance education process on internet and screen addiction.

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## Statements of publication ethics

I/We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

## Ethics Committee Approval Information

Ethical permission was obtained for this research from the Human Research Ethics Committee of Zonguldak Bülent Ecevit University (10/11/2020-916).

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## Appendix-1. Parent Interview Questions

1. What do you think about distance education during the COVID-19 pandemic? What kind of problems did you encounter?
2. Did the management of the school where your child is studying contacted you about distance education? What are your expectations from the school administration?
3. What kind of measures does the school administration take during the COVID-19 pandemic? What do you think about sending your child to school?
4. How is parent-teacher communication carried out during the COVID-19 pandemic? What are your expectations from teachers?
5. How does your child view the lessons during the COVID-19 pandemic? Do you have distraction and concentration problems?
6. How do you support your child's participation in the lessons during the distance education process?
7. Do you think there are points that need to be corrected in distance education? What arrangements can be made to make distance education more efficient?

## Appendix-2. Student Interview Questions

1. What do you think about distance education during the COVID-19 pandemic? What kind of problems did you encounter?
2. What kind of measures does the school administration take during the COVID-19 pandemic? What do you think about going to school?
3. How is your communication with your teacher during the COVID-19 pandemic? Does your teacher spend enough time with you? What are your expectations from your teacher?
4. How do you access classes during the COVID-19 pandemic? Can you get to classes on time? Which course do you have the most difficulty with?
5. What do you think about the homework given during the COVID-19 pandemic? How are assignments delivered and checked?
6. What kind of support does your family give you during the distance education process? How is a suitable environment provided for your participation in classes?
7. Are there any points that need to be corrected in distance education? What arrangements can be made to make distance education more efficient?

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| Research Article / Araştırma Makalesi |

# Investigation of the Conceptual Knowledge of Preschool Teacher Candidates on Science Education

# Okul Öncesi Öğretmen Adaylarının Fen Eğitimine Yönelik Kavramsal Bilgilerinin İncelenmesi

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**Keywords**

1. Preschool
2. Teacher candidates
3. Science education
4. Conceptual knowledge
5. Qualitative research

**Anahtar Kelimeler**

1. Okul öncesi
2. Öğretmen adayı
3. Fen eğitimi
4. Kavramsal bilgi
5. Nitel araştırma

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## Abstract

*Purpose:* This study aims to investigate the conceptual knowledge of preschool teacher candidates toward science education.

*Design/Methodology/Approach:* Thirty-eight junior teacher candidates at a state university in the Black Sea Region of Turkey participated in the research. The study is a qualitative type of research, and Interviews and activity plans were used for data collection. The content analysis method was applied in the analysis of the data. After the responses of the teacher candidates were noted, they were coded and divided into categories. Then, themes were created according to these categories and the findings were interpreted under these theme headings.

Findings: The research findings revealed that preschool teacher candidates lack adequate conceptual knowledge toward science education, especially in using science process skills, determining the role of preschool teacher in science education.

*Highlights*: The education given in preschool teacher education undergraduate programs should not remain only at the theoretical level, teacher candidates should be allowed to practice in the preschool science education course, and it is believed that each teacher should be given information about current and different methods to use in their professional lives, and encouraged to use them in their teaching profession.

## Öz

*Çalışmanın amacı:* Bu araştırmada, okul öncesi öğretmen adaylarının fen eğitimine yönelik kavramsal bilgilerinin incelenmesi amaçlanmıştır.

*Materyal ve Yöntem:* Araştırmaya, Türkiye'nin Karadeniz Bölgesi'nde bulunan bir devlet üniversitesinde 3.sınıfa devam eden 38 öğretmen adayı katılmıştır. Araştırma nitel bir araştırma olup, görüşme ve etkinlik planları veri toplama aracı kullanılmıştır. Verilerin analizinde içerik analiz yöntemi uygulanmıştır. Öğretmen adaylarının cevapları not edildikten sonra kodlanarak kategorilere ayrılmıştır. Daha sonra bu kategorilere göre temalar oluşturulmuş ve bu tema başlıkları altında bulgular yorumlanmıştır.

*Bulgular:* Okul öncesi öğretmen adaylarının özellikle bilimsel süreç becerilerini kullanmada ve fen eğitiminde okul öncesi öğretmenin rolünü ortaya koymada yeterli kavramsal bilgiye sahip olmadıkları görülmüştür.

*Önemli Vurgular:* Okul öncesi öğretmenliği lisans programlarında verilen eğitim yalnızca teorik düzeyde kalmamalı, okul öncesinde fen eğitimi dersinde öğretmen adaylarına uygulama yapma imkanları verilmeli, her öğretmene meslek yaşantılarında kullanabilmeleri için güncel ve farklı metotlar hakkında bilgiler verilerek, öğretim süreçlerinde kullanmalarının teşvik edilmesi önerilmektedir.

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## INTRODUCTION

Science education can be considered the common area of interaction between human, science, and technology elements (Andaç, 2003). In general terms, it is possible to define science education as reflecting the ability to observe and think about actions and events (Alisinanoğlu et al.,2011). Science offers us opportunities to explore the world and understand the events that take place in nature. Starting from early childhood, children can explore the environment and gain experience through research, asking questions, thinking, observing, communicating, making inferences, and guesses, and experimenting in science activities. Children who have the desire to explore and develop a positive attitude toward science, and children who have a sense of discovery, and curiosity are motivated to learn more when they are offered an enriched environment (Arı & Çelebi-Öncü, 2005).

Thanks to their natural curiosity, children's efforts to recognize what is happening around them and to make sense of the world from the moment they are born constitute the first science experiences of their lives (Aktaş-Arnas et al., 2014). These experiences and achievements that children will acquire at an early age have the power to influence their later learning life as well as to direct their social and emotional life (Kesicioğlu, 2019). In this context, in early childhood, which is an important part of the education process, it is quite important to provide children with a love of science, successful experiences, and positive feelings about science activities for guiding the individual's experiences with science in later life and for the benefit of the society in general.

Science activities are important for children in terms of facilitating daily life and improving the existing skills of individuals (Nacar & Kutluca, 2020). These activities provide observation, communication, prediction, and inference, which form cognitive process skills. While learning, children can also transfer what they have learned to another topic, they carefully observe, guess, ask questions, explore, and interact with friends and teachers (Sak et al., 2018). Through interactions, teachers play a key role in the development of scientific thinking in children and, in their later years, in their positive attitude toward science (Thulin & Redfors, 2017). If children are not adequately supported by their teachers when they are new to science-related activities and have negative experiences, they will mostly avoid science-related activities for the rest of their lives and will prefer to stay away.

Science education in the preschool period should not be in the form of transferring basic information about science, but in a way that satisfies the child's curiosity and directs the child to explore and research. The task of the preschool teacher is not limited to planning and implementing science activities and providing the necessary materials on the subject (Simsar & Doğan, 2019). The teacher's task is not only to convey information to children but also to encourage them to research, to organize the learning environment in a way that supports children's development, to help them establish cause-and-effect relationships, and to guide them to make inferences from experiences by contributing to the development of basic science process skills (Bilaloğlu, 2014; Saçkes et al., 2011). In this process, for teachers to guide children correctly, they should know the importance and purpose of science education in the preschool period, they should have adequate knowledge about the methods and techniques that will make learning more effective and remarkable to ensure active participation of children in science activities, and they should try to improve children's skills in science through various methods and techniques (Demir & Şahin, 2015). Teachers should give importance to children's knowledge acquisition through observing and making sense of the events around them and encourage this natural sense of curiosity in children. In this context, it will be a good role model for children if teachers keep their sense of curiosity alive and effective (Ünal & Akman, 2006). The level of knowledge of teachers about science education, their opinions, attitudes, proficiency levels, and whether there are any disadvantages experienced in the previous learning process are very important in terms of science education. A teacher is expected to have information about the education to be given, to improve himself/herself by the following science, to give importance to new and alternative ideas, and to provide the foundation of science teaching to children (Nacar & Kutluca, 2020). Preschool teachers, who are the first teachers that have a lasting impact on children's lives, need to know about the learning and development of children, knowledge of the field and the objectives of the program, and teaching knowledge (Darling-Hammond & Baratz-Snowden, 2005). Therefore, the conceptual knowledge of preschool teachers about science education is important in terms of effective science teaching.

Teachers, together with information resources and curriculum, are among the most important factors affecting the success of students in the teaching process. In this context, how the teacher will use the information he/she has is very important for the healthy execution of the process. Teachers should have many competencies, such as correctly diagnosing and meeting student needs, providing problem-solving skills to their students as well as solving problems themselves, and ensuring that the objectives set in the curriculum are achieved by students to realize these factors that significantly affect the teaching process (Seferoğlu, 2004; Karacaoğlu, 2008). The competencies that teachers should have for science education to be given in the preschool period are listed as follows; (1) To understand the nature of scientific research and to know how to use scientific research processes and skills, (2) To understand the basic concepts and facts in the field of science, (3) To be able to establish a relationship between the concepts in mathematics, technology, and other fields as well as the conceptual relationship between science disciplines (physics, chemistry, biology), (4) To be able to use scientific research and skills in the approach to personal and social problems (Martin, 2001). Not having adequate conceptual knowledge in terms of science education or having various misconceptions about this field may cause teachers to transfer their misconceptions to children, or fail to notice the misconceptions in children or reinforce these misconceptions (Saçkes et al., 2012, Şenel & Aslan, 2014).

Concept is defined as a set of meanings which include similarities, differences and relationship concerning things observed (Koniceck-Moran & Keeley, 2015). Construction of a concept in human mind is associated with conceptual understanding. Koniceck-Moran and Keeley (2015) asserted that conceptual understanding provides people with thinking with the concept, using it in real life situations, describing it with their own words. In this study, conceptual understanding of preschool teacher candidates on science education which means what they know about teaching science was examined. One of the conceptual knowledge that preschool teacher candidates should have for science education is scientific processes skills which is defined as abilities that reflect how scientists think and act (Padilla, 1990). Studies on scientific process skills have especially emphasized that children should be introduced to these skills in the preschool period, raise their awareness of science, and learn to use scientific process skills effectively in their later life (Ayvacı, 2010). Especially in the studies carried out during the preschool period (Ayvacı et al., 2002; Akman et al., 2003; Karamustafaoğlu & Kandaz, 2006; Adak, 2006; Uysal, 2007; Kıldan & Pektaş 2009; Özbey & Alisinanoğlu, 2009; Özbek, 2009; Öztürk, 2010; Sansar, 2010; Ayvacı, 2010; İnan, 2011; Kandemir, 2011), the teacher factor is at the forefront in the acquisition of scientific process skills. The results of these studies also show that teachers who will provide scientific process skills to students should know "what" to provide "how" to provide scientific process skills to children, that is, they should have conceptual knowledge about the acquisition of scientific process skills (Özbey & Alisinanoğlu, 2009, 2010; İnan, 2010,2011; Kefi et al., 2013; Kefi & Çeliköz, 2014).

Considering the literature about the nature of science, it is seen that there are many studies with students, teacher candidates, and teachers. It is seen that some of these studies are conducted to reveal the views of teachers and teacher candidates about the nature of science, some of them are made to improve these views, and some of them are made to investigate the applications of these views in the classroom.

When the studies on teacher candidates were examined, it was seen that the opinions of teacher candidates were not at a sufficient level and they had various misconceptions (Abd-El-Khalick et al.,1998; Abd-El-Khalick & Akerson, 2004; Köseoğlu et al., 2010; Karaman, 2018; Korkmaz, 2018, Zhang et al., 2021). In their studies with preschool teacher candidates, Erdas-Kartal and Ada (2018) aimed to reveal the current understanding of teacher candidates about the nature of science. As a result of this study, it was realized that the majority of preschool teacher candidates have insufficient knowledge about the nature of science and various misconceptions. Türk, Yıldırım, Bolat, and İskeleli (2018) also investigated whether there was a difference in the views of preschool teacher candidates on the nature of science according to their grade levels. Freshman, sophomore, junior, and senior teacher candidates in the preschool teaching department participated in the research. According to the study results, it was found that there was no significant difference between the opinions of the teacher candidates about the nature of science and that their opinions were similar.

While there are studies in the science education conceptual knowledge literature that address the conceptual information of science teacher candidates from different angles, there is a limited number of studies on teacher conceptual knowledge in the science education process in the preschool context. In addition to being a gap that needs to be filled in the literature, the main purpose of this study is to evaluate the conceptual knowledge competence of preschool teacher candidates for science education. For this purpose, the following sub-problems were investigated:

- What is the status of the conceptual knowledge of preschool teacher candidates concerning science education?

## METHOD/MATERIALS

### Research Design

In this study, phenomenological research design, which is one of the qualitative research methods, was used. The phenomenological research design aims to reveal the experiences, perceptions, and meanings that individuals attach to a phenomenon (Fraenkel et al., (2011). The phenomenon to be investigated here is determined as the science education field knowledge. Qualitative studies adopt qualitative data collection techniques such as observation, interviewing, and document analysis, and follow a qualitative process to reveal existing events and phenomena realistically and holistically in their natural environment without any intervention (Yıldırım & Şimşek, 2021). Interviews were carried out with preschool teacher candidates. After the interview, the teacher candidates were asked to design an activity plan with five of the scientific process skills and the dimensions of the nature of science. Activity plans designed by teacher candidates were examined.

### Study Group

In the study, teacher candidates who can be reached by the researcher with an easily accessible sampling method were included in the study group. Easily accessible, convenient sampling relies on entirely available, quick, and easy-to-access items (Baltacı, 2018). The study group consists of 38 junior (34 females, 4 males) preschool teacher candidates, studying at a state university located in the Black Sea Region of Turkey.

### Data Collection

The study data were collected by interview and activity plans. An interview allows the interviewees to express themselves first-hand and allows the researcher to understand their sense of meaning, perspectives, feelings, thoughts, and experiences of the interviewees with the help of their expressions (McCracken, 1988). As the data collection tool, a semi-structured interview form

prepared by the researcher in line with the literature and purpose of the research was used. The interview form consists of 5 items to determine the knowledge of teacher candidates about science education. The interview form includes items about the importance of science education, the dimensions of the nature of science, scientific process skills, misconceptions, and methods and techniques used in science education. These questions are determined according to the textbooks of preschool teacher candidates (e.g. Alisinanoğlu et al., 2011; Ayvacı & Ünal, 2021). These textbooks generally include the headlines that the preschool teacher candidates should learn to teach science in the future. Therefore, there is a variety of questions regarding different areas. In the application part, individual interviews were made with teacher candidates and the data were recorded by taking notes. At the end of the interviews with the teacher candidates, they were asked to design an activity plan by using scientific process skills and the nature of science. These activity plans were used as another data source for the research. In addition to interview questions, the researchers asked the preschool teacher candidates to prepare one activity plan related to science education by using scientific process skills. Before the preparation, the researchers tried to help them write lesson plan by answering their questions and showing the format of activity plan which includes some headlines such as objectives, materials, learning process, evaluation.

### Data Analysis

In the analysis of the data, the interview records and lesson plans were analyzed by content analysis. Content analysis is "the objective and systematic classification of the message contained in verbal, written, and other materials in terms of meaning and/or grammar, transforming it into numbers and making inferences" (Tavşancıl & Aslan, 2001). After the responses were noted, they were coded and divided into categories. Then, themes were created according to these categories and the findings were interpreted under these theme headings. In the interpretation of the findings, it was tried to provide validity by including direct quotations from the opinions of the teacher candidates. Expert opinion was taken in developing the interview form to ensure the validity of the study. Collaboration was made with an assistant researcher who specialized in the subject area and qualitative analysis of the research. Ten percent of the data obtained in the study were analyzed by this researcher. A consistency of 80% was found between the analysis results of the researchers. In addition, the categories that the researchers created differently were compared. In the comparisons, the reliability of the research was calculated using the formula of Miles and Huberman (1994) (Reliability = consensus / (consensus + disagreement) × 100) by determining the number of "consensuses" and "disagreements". The fact that a consensus of 96% was reached in this study is considered sufficient in terms of the reliability of the study.

## FINDINGS

The qualitative findings obtained as a result of determining the knowledge of preschool teacher candidates about science education were evaluated and analyzed based on the questions asked. The findings obtained through the thoughts and opinions of the teacher candidates are presented below in the tables. Responses of the teacher candidates to the question "Why is science education important in preschool?" are shown in Table 1. When we look at Table 1, the majority of the teacher candidates (*f*=18) believe that science education is important since it improves children's curiosity and exploration feelings. For example, the statement of the TC13 regarding the question is as follows: "Children have a curiosity about the environment and want to explore their environment. That's why science education should be provided."

**Table 1. The Importance of Science Education for Preschool Teacher Candidates**

| The Importance of Science Education | *f* |
|---|---|
| Developing feelings of curiosity, and discovery | 18 |
| Providing transfer of knowledge to everyday life | 14 |
| Developing a positive attitude toward the science | 13 |
| Preparation for primary school | 11 |
| Improving language skills | 9 |
| Achieving development potential | 9 |
| Improving creativity | 7 |
| Enabling them to learn by experimenting and doing | 7 |
| Improving mathematical skills | 3 |
| Finding a solution to the language problem | 3 |
| Ensuring scientific literacy readiness | 3 |
| Providing embodying | 2 |

In addition, it is understood that they also mention the importance of science education, transferring to daily life, developing a positive attitude toward science, and preparing for primary school. There are also opinions that science education is important in terms of improving language skills and reaching the potential for development. Stating that science education is important since it provides solutions to the language problem, TC5 stated the following: "Science education is important for children with language problems. Communication during science education will be important to solve the problem." Teacher candidates also expressed the importance of science education in terms of providing learning opportunities by living, doing, and developing creativity.

However, very few teacher candidates emphasized the importance of science education since it embodies abstract concepts (*f*=2), and solves the language problem in the science education process (*f*=3).

Responses to the question "What is the role of the preschool teacher in science education?" are presented in Table 2. It is seen that teacher candidates address mostly the roles of a preschool teacher in providing the necessary environment and material (*f*=14), guidance (*f*=13), and enabling the child in the process (*f*=12). In addition, it is understood that they include roles of not causing misconceptions, directing, supporting, and encouraging. In this regard, the statement of the TC5 is as follows: "The teacher should assume a guiding role, this should be done unemphatically. A teacher should enable children to find by experimenting, allowing them to explore, and guiding them by asking questions. A teacher should encourage children by asking why not, and let's try."

**Table 2. The Role of Preschool Teacher in Science Education for Preschool Teacher Candidates**

| The Role of Preschool Teacher | *f* |
|---|---|
| Providing the necessary environment and material | 14 |
| Guidance | 13 |
| Active engagement of children in the process | 12 |
| Avoiding misconceptions | 9 |
| Directing, supporting, encouraging | 8 |
| Keeping children's curiosity active and attracting their interest | 6 |
| Knowing the level of development, knowing the developmental characteristics | 6 |
| Popularizing science, developing a positive attitude toward science | 4 |
| Teaching scientific process skills | 4 |
| Triggering the desire to explore, and discover | 4 |
| Improving creativity | 4 |
| Supporting their questioning, revealing knowledge by asking questions | 3 |
| Teaching a subject that is well-known by the teacher, teaching after having a good command of the subject. | 2 |
| Providing means for observation | 2 |
| Using a variety of teaching methods and techniques | 2 |

Expressions that emphasize drawing the attention of children by placing importance on their curiosity, and knowing the development levels and developmental characteristics of children are also noteworthy. In addition, it is seen that teacher candidates equally address the roles of popularizing science, developing a positive attitude towards science (*f*=4), triggering their desire to explore/discover (*f*=4), developing their creativity (*f*=4), and providing scientific process skills (*f*=4). Apart from these, teacher candidates stated that the preschool teacher has roles such as being a role model in science education, creating a science-related infrastructure, providing a discussion environment with the help of experiments, encouraging a sense of curiosity, self-development by following the science, and ensuring the development of science-related skills by using different method techniques. Supporting the teacher's role of self-development, the TC12 states as follows: "A teacher should teach what he or she knows well. If a teacher does not have a good level of knowledge, the teacher should first improve himself/herself and then do activities with children." TC7, however, addressed the role of providing a collaborative learning environment. "A teacher should create a collaborative learning environment through group work. A teacher should enable children to think together and put forward a common product."

The responses of teacher candidates to the question "What are the dimensions of the nature of science? Explain briefly. By discussing approaches to teaching the nature of science, which is more appropriate for use in the preschool period?" are given in Table 3 and Table 4.

**Table 3. Teacher Candidates' Knowledge of the Dimensions of the Nature of Science**

| Dimensions of the Nature of Science | *f* |
|---|---|
| Scientific knowledge is subjective/theory-laden. | 34 |
| Scientific knowledge is experimental. | 30 |
| It depends in part on imagination and creativity. | 30 |
| Scientific knowledge is not conclusive. | 29 |
| Scientific knowledge consists of a combination of observations and inferences. | 26 |
| Scientific knowledge is socially and culturally established. | 24 |
| There is a difference between scientific law and theory. | 24 |

While it was seen that 16 of the teacher candidates knew all the dimensions of the nature of science, it was determined that 11 of the same teacher candidates did not know the teaching approaches for the nature of science teaching. It is seen that some teacher candidates know the name of the approaches incorrectly or do not know one or more of the approaches. For example, the TC20 expressed the nature of science as "it explains to us what science is, how science is, and to who is called a scientist, and what their role is." The approaches to teaching the nature of science were divided into 3 types: natural, direct, and historical.

When the dimensions of the nature of science are known in individual answers, it is seen that 34 of the teacher candidates know the dimension of "scientific knowledge is subjective/theory-laden". The most well-known dimension of the nature of science is the "scientific knowledge is subjective/theory-laden" dimension, while the least known dimensions are "scientific knowledge is socially and culturally established" and "there is a difference between scientific law and theory".

Very few teacher candidates included the dimensions of "scientific knowledge contains a combination of observations and inferences", and "scientific knowledge is experimental" in the same item (*f*=2). While 22 teacher candidates explained the dimensions of the nature of science, 8 teacher candidates failed to explain the dimensions. It was determined that teacher candidates generally know the dimensions of the nature of science, but did not address the teaching approaches and evaluated the dimensions of the nature of science according to the suitability for use in the preschool period.

It was determined that very few teacher candidates responded to the question incorrectly and had a misconception about the subject (*f*=2). TC4 has addressed the dimensions of the nature of science as the "physical dimension, the cognitive dimension, the space dimension". The TC13 divided the dimensions of the nature of science into basic process skills and integrated process skills. It is understood that this teacher candidate confuses scientific process skills with the dimensions of the nature of science.

**Table 4. Teacher Candidates' Knowledge about the Approaches to Teaching the Nature of Science**

| Approaches | *f* |
|---|---|
| Direct | 13 |
| Historical | 13 |
| Indirect | 12 |
| Multiple Unified Approach | 9 |

While 11 of the teacher candidates knew all the approaches to teach the nature of science, it was determined that one candidate did not know the multiple unified approach. Another teacher candidate, however, knows only the direct and historical approach. It is seen that the three teacher candidates call the multiple unified approach integrated, holistic, or multi-dimensional. It was determined that these teacher candidates knew that there were four approaches, but they confused the name of one of them.

Five of the teacher candidates believe that it is appropriate to use the indirect approach, one multiple unified, and three of them believe that it is appropriate to use the indirect and historical approaches in the preschool period. Considering the use of the indirect approach in the preschool period, TC11 states that "Mostly the indirect approach should be used in the preschool period. This is because, the aim is to enable the child to explore and question, without memorized information." TC26, however, stated that "The indirect approach should be used in the preschool period. It is more effective since the child will actively access information and see it by experimenting.

If we examine the responses of the teacher candidates who consider it appropriate to use the multiple unified approach in the preschool period, TC18 states, "In my opinion, the multiple unified approach in the preschool period is the most appropriate. This is because the combination of multiple approaches completes the lack of a single approach.", he responded. It was determined that one of the teacher candidates wanted to express the multiple unified approach, called the holistic approach.

Of the teacher candidates who consider it appropriate to use indirect and historical approaches at the same time, TC7 stated that "Indirect and historical approaches can be used. This is because the nature of science can be given by the indirect approach, children can observe how an invention is made and what are the processes in the course of an invention with the help of the historical approach."

**Table 5. Teacher Candidates' Use of Scientific Process Skills in the Activity Planning**

| Scientific Process Skills | *f* |
|---|---|
| Observation | 28 |
| Inference | 23 |
| Communication | 17 |
| Classification | 12 |
| Experimenting | 12 |
| Prediction | 10 |
| Measurement | 8 |
| Hypothesizing and testing | 3 |
| Comparison | 1 |
| Definition and control of the variables | - |

The responses of the teacher candidates to the statement "Write an activity plan using the scientific process skills and the dimensions of the nature of science" are presented in Table 5. Teacher candidates used mostly the observation skills in the activity plan, and minimally the comparison skills in the activity plan. Very few teacher candidates used hypothesizing/testing (*f*=3) and comparison (*f*=1) skills in the activity plan. Advanced scientific process skills, such as the ability to identify and control the variables,

were not addressed well. Some of the teacher candidates included problem-solving (*f*=1), problem setting (*f*=1), interpreting the data (*f*=2), and collecting the data (*f*=1) skills in the activity plan. Referring to the problem-solving skills in the activity plan, TC11 stated: "The teacher tells stories. At the end of the story, the teacher asks 'they wanted to cross the stream in the picnic area, but how can they pass, let's help Ayşe and her friends together? How can we help them? ..." Referring to the ability to interpret the data, TC4 said, "After the experiment, the teacher proceeds to the evaluation. A teacher should ask what they did today and what they learned, what they thought of what they learned.", she noted. Referring to the problem-setting skills, TC25 stated: "Teacher wants to help children to identify the problem by asking 'in your opinion what problems arise if our water becomes dirty?'"

**Table 6. Teacher Candidates' Correct Use of Scientific Process Skills**

| Scientific Process Skills | *f* |
|---|---|
| Observation | 23 |
| Inference | 19 |
| Communication | 14 |
| Classification | 12 |
| Experimenting | 10 |
| Prediction | 8 |
| Measurement | 7 |
| Hypothesizing and testing | 3 |
| Comparison | 1 |
| Definition and control of the variables | - |

Teacher candidates often used basic, intermediate, and advanced process skills together in their activity plans. When Table 5 and Table 6 were compared, it was found that the teacher candidates correctly explained comparison, classification, and hypothesizing skills. It is seen that they cannot use observation (*f*=5), inference (*f*=4), communication (*f*=3), estimation (*f*=2), experimentation (*f*=2), and measurement (*f*=1) skills correctly in the activity plan. Some students seem to confuse the predictive skill and inference skills. In the activity plan, TC9 said, "The teacher first goes out to the garden with the children and talks about the weather. He/she then asks how the rain is formed." The candidate named this statement as a prediction. On the other hand, it is observed that he uses his inference skill since it is a question of how rain is formed. This suggests that TC9 confuses predictive skills and inference skills.

When communication in scientific process skills is considered a skill in which students share their knowledge, and produce feedback to each other, that is, establish scientific communication, it is understood that teacher candidates perceive communication skills as "creating a conversation environment with the questions directed by the teacher to the children". For example, TC8 stated, "Teacher creates a conversation environment by asking questions, such as 'Why are our teeth important to us? Do you brush your teeth? What foods are unhealthy for our teeth? ..." The candidate named this statement as communicating.

It is seen that teacher candidates also explain the prediction skill incorrectly. In their statements, teacher candidates did not mention the situations that children could predict by establishing cause-and-effect relations. It was determined that teacher candidates explained the predictive skills in the sense of reaching conclusions by using random information about something unknown. For example, TC11 denoted the sentence "The teacher asked the children how the car with a magnet glued to the top is on the moon now, which was first on the ground in the world..." sentence as a prediction. This shows that some teacher candidates are mistaken in this regard.

**Table 7. Teacher Candidates' Knowledge about the Steps in Eliminating Misconceptions**

| Steps | *f* |
|---|---|
| Those Who Know the 1st Step | 38 |
| Those Who Know the 1st and 2nd Steps | 32 |
| Those Who Know the 1st, 2nd, and 3rd Steps | 32 |
| Those Who Know the 1st and 3rd Steps | 6 |

Responses of the teacher candidates to the question "What is a misconception? What should be done to eliminate misconceptions?" are presented in Table 7. Thirty-one of the teacher candidates responded with an explanation of the misconception and 30 people responded with the way to eliminate the misconceptions correctly. Some made an explanation of the misconception incomplete (*f*=3) and those who could not answer the question (*f*=4). Three steps should be followed in eliminating misconceptions. The first is to identify children's preconceptions or misconceptions, the second is to provide a suitable environment for children to become aware of their preconceptions or misconceptions, and the third is to help children restructure and internalize their knowledge based on scientific models. All the teacher candidates knew the first and third of these steps. However, one teacher candidate misrepresented the second step and one teacher candidate misrepresented all three steps. Six teacher candidates knew the first and last steps but did not specify the second step.

Responses of the teacher candidates to the question "What are the methods or techniques used in science education in the preschool period? Specify these methods together with the implementation stages." are presented in Table 8. Teacher candidates

stated the methods or techniques used in science education as analogy, argumentation, drama, experimentation, problem-solving, project-based learning, concept maps/cartoons, and STEM studies. Of the methods and techniques, the most known is the analogy and the least known is the problem-solving technique. Many of the teacher candidates expressed the analogy technique in the form of explaining abstract concepts by comparing them to concrete concepts and explaining an unknown phenomenon with a known fact. It was seen that the teacher candidates were adequate in explaining the analogy technique and that they were inadequate in the application stages and points to be considered. For example, TC1 states, "A concept from simpler everyday life is used to describe a concept. It has 3 dimensions: simple, story-oriented, and play." The question was considered as correctly answered when the explanation of the analogy technique was made when the types and the points to be considered while applying the technique were mentioned. It was also seen that teacher candidates make wrong and incomplete explanations about the analogy technique. The TC16 explained the analogy technique as follows: "A discussion is formed by using hypotheses for the ideas defended on a particular topic." If the technique of analogy is defined as explaining an unknown phenomenon by comparing it to a familiar phenomenon, it can be stated that TC16's explanation of the technique is wrong.

**Table 8. Teacher Candidates' Knowledge of the Methods or Techniques Used in Science Education**

| Method or Technique | *f* |
|---|---|
| Analogy | 36 |
| Argumentation | 35 |
| Drama | 35 |
| Experimenting | 35 |
| Concept Map and Cartoons | 35 |
| Project Based Learning | 34 |
| STEM | 34 |
| Problem Solving | 32 |

While 23 teacher candidates mentioned the methods given in the table in their responses, nine teacher candidates failed to mention only one method, four teacher candidates failed to mention two methods, and one teacher candidate failed to mention three methods. Teacher candidates never mentioned observation, field trips, and brainstorming methods, which are one of the methods used in preschool science education. It was found that some of the teacher candidates did not mention the problem-solving method (*f*=5), project-based learning approach and STEM studies (*f*=3), concept maps/cartoons, experimentation, drama and argumentation methods/techniques (*f*=2), and analogy technique (*f*=1).

It was seen that teacher candidates mostly made the explanation of drama technique and project-based learning approach inadequate. While explaining the drama technique, the teacher candidates addressed the term animation, creativity, improvisation, and role-playing. It is seen that they know that there are 3 stages of application of the drama technique, but they do not know the contents of the stages. TC8 stated, "In the drama method, there is learning without any stereotyping for the children. There are stages of warm-up, foundation, and evaluation. The important point here is to enable the child to learn by having fun using imagination and creativity." When the statement of the teacher candidate is examined, it is understood that he/she knows the stages but does not know what to do within the stages.

While explaining the project-based learning approach, the teacher candidates mentioned that it is a method that includes discovery, research, and in-depth examination, which leads to a product as a result. It was found that some teacher candidates name the stages differently when it is known that planning, implementation, and finalizing the project are the implementation stages of the project-based learning approach. It is seen that the TC10 lists the stages as "Determination of the project subject, calculating the schedule and cost, collecting information, choosing the method, application, writing the report". TC18 said, "A project needs to emerge to solve the identified problem. He explained the stages as "to make observations, to classify, to communicate, to measure, to evaluate for finding solutions."

## DISCUSSION

This study aims to reveal the conceptual knowledge levels of preschool teacher candidates toward science education. According to the studies examined, there were not many studies on conceptual knowledge in the preschool period, and there were no available findings regarding the conceptual knowledge of teachers about science education in the preschool period. For this reason, to reveal the conceptual knowledge of the teacher candidates, their interactions with each other, and the relationships between them, the participants' activity plans and conceptual knowledge interview questions were evaluated together. In the literature, the relationship between these components is revealed to define the quality of conceptual knowledge for science education in the preschool period, which sheds a light on the conceptual information that teacher candidates should have (Lankford & Hepworth, 2010).

Considering the level of familiarity of teacher candidates with scientific process skills, it was found that they were more familiar with basic scientific process skills, but less familiar with high-level scientific processes. In his study, Miles (2010) showed that

teacher candidates were highly familiar with basic scientific process skills. Similar results are also found in other studies. In their studies with teacher candidates, Aydoğdu and Buldur (2013), and Laçin-Şimşek (2010) stated that teacher candidates were successful in using basic scientific processes, but this success was lower in high-level scientific skills. This result is in line with the results of the research. In addition, Laçin-Şimşek (2010) determined that some teacher candidates had misconceptions and incomplete information. In this study, it was found that teacher candidates confused the scientific process skills of prediction and inference with each other. In similar studies, Kefi et al.,(2013), Batı et al.,(2010), Karslı et al.,(2009), Aydoğdu (2006), Cho et al., (2003), and Kallery and Psillos (2001) concluded that teachers do not know the names and meanings of some scientific process skills.

The fact that preschool teacher candidates do not know the methods and techniques used in science education such as observation, field trips, and brainstorming techniques indicates the inadequacy of their conceptual knowledge. The inadequacy of these methods leads to the fact that teachers cannot use these methods and techniques in science lessons.

Another important finding obtained in the study is that it was concluded that teacher candidates consider it more appropriate to use historical and indirect approaches in teaching the nature of science, but they emphasize traditional teaching approaches while using these methods. From this point of view, it is understood that there is no relationship between the knowledge of teacher candidates on the nature of science and their conceptual knowledge. This result is in line with the results of many other studies in the literature (Brickhouse, 1990; Mellado 1997; Abd-El-Khalick et al., 1998; Tobin & McRobbie 1997; Lederman 1999).

Harrison and De Jong (2003) believe that children's prior knowledge and concepts of science are beneficial for the teacher in the planning phase of the applications, and argue that this is related to the conceptual knowledge of the teachers that can ensure effective learning. In this context, it is necessary to have adequate knowledge of strategies, methods, and techniques and to determine the strategy, method, and technique specific to the subject area selected during the teaching. It is seen that teacher candidates know the methods/techniques used in science education, analogy, argumentation, drama, experiment, problem-solving, project-based learning, concept map/cartoons, and STEM studies. From this, it was concluded that the knowledge of the participants about the teaching strategies was sufficient.

## CONCLUSION AND RECOMMENDATIONS

It is seen that the level of teachers' conceptual knowledge about science education, and therefore their level of knowledge in the subject area is an important factor in terms of science education. This is because teachers having insufficient knowledge can convey misinformation and misconceptions to students. During the undergraduate period, instructors are required to take into account the misconceptions of teacher candidates. If the preliminary concepts and misconceptions of the students are known, the curriculum can be designed more appropriately. In this way, the misconceptions of teacher candidates can be minimized before starting their professional life.

If the concepts of science education, the teaching of scientific process skills, and the nature of science cannot be included in the preschool education undergraduate program, the course hours of the "Science Education in Preschool" course in the current preschool teacher education undergraduate program can be increased, and teaching of scientific process skills and the nature of science can be included into the content of this course.

According to the results obtained, it was seen that teacher candidates did not have adequate conceptual knowledge. The reason for this situation may be that preschool teacher candidates do not process science education courses effectively during their undergraduate education. For this reason, it is considered important to make the necessary arrangements in the content of the "Science Education" course, the methods-techniques, and materials used to ensure that the conceptual knowledge of the teacher candidates for science education is at a high level.

For the conceptual knowledge levels of preschool teacher candidates in science education to reach an adequate level, it may be recommended to use activities that will make them love science and give them a positive attitude throughout their undergraduate education. Instructors who teach science education courses in undergraduate education can help teacher candidates gain a perspective on what kind of activities they should use, especially through activities that embody abstract concepts.

This study is limited to preschool teacher candidates studying at a university in the Black Sea Region. Considering the various socio-economic and cultural structures of Turkey, studies can be carried out with preschool teacher candidates from different regions and universities to generalize the results of the study.

Teacher candidates were studied in this research, but in future studies, similar applications can be carried out with teachers who have just started their profession and with experienced teachers. In this way, a generalization can be made about the state of their conceptual knowledge of science education.

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**Statements of publication ethics**

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

**Researchers' contribution rate**

The study was conducted and reported with equal collaboration of the researchers.

**Ethics Committee Approval Information**

Ethical approval for the current study was taken from the Social Sciences & Humanities Ethics Committee at the University of Kastamonu (07/09/2022).

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| Research Article / Araştırma Makalesi |

# Teacher Candidates' Attitudes Towards Emergency Remote Education and Their Evaluations of the Education Process

## Öğretmen Adaylarının Acil Uzaktan Eğitim Algıları ve Eğitim Sürecine İlişkin Değerlendirmeleri [1]

**Fatih Yaman**[2], **Nihal Dulkadir Yaman**[3]

**Keywords**

1. Emergency remote education
2. Attitudes towards emergency remote education
3. Evaluation of emergency remote education
4. Emergency remote education process
5.Teacher candidates

**Anahtar Kelimeler**

1. Acil uzaktan eğitim
2. Acil uzaktan eğitim tutumu
3. Acil uzaktan eğitimi değerlendirme
4. Acil uzaktan Eğitim süreci
5. Öğretmen adayları

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***Abstract***

*Purpose:* The aim of this study is to examine the attitudes of teacher candidates towards emergency remote education and their self-evaluation of using these environments.

*Design/Methodology/Approach:* Survey model was adopted in this study that aimed to examine teacher candidates' perceptions of emergency remote education and their reflections on the emergency remote education process. The present study was conducted by following two steps. The Distance Education Attitudes Scale was first adapted into Turkish, and then both the Distance Education Attitudes Scale and the Distance Education Evaluation Scale were administered to the teacher candidates.

*Findings:* Based on gender, the teacher candidates' attitudes showed no significant in the DRDE dimension while there was a statistically significant difference in the EDE dimension. The teacher candidates' evaluation of the distance education process significantly differed in the LP dimension, but did not in the TI dimension. No significant difference was observed in the emergency remote education attitudes of the students who were exposed to emergency remote education in the first and second years of higher education and who are currently studying their third and fourth years. In a similar vein, there was no difference in terms of their study programs.

*Highlights:* In this study, the emergency remote education attitude scale was adapted to Turkish. In this context, this study will contribute to the literature. It is important for teacher candidates to evaluate themselves in the emergency remote education process as well as determining their emergency remote education attitudes. After the distance education attitude scale was adapted to Turkish, data were collected with the distance education evaluation scale and the situation of the teacher candidates was tried to be determined. As a result of the study, it is important that there is no differentiation in terms of gender, class level or department in situations that require technology literacy skills.

***Öz***

*Çalışmanın amacı*: Bu çalışmanın amacı, öğretmen adaylarının acil uzaktan eğitime yönelik tutumlarını ve bu ortamları kullanmaya yönelik öz değerlendirmelerini incelemektir.

*Materyal ve Yöntem:* Öğretmen adaylarının acil uzaktan eğitime ilişkin algılarını ve acil uzaktan eğitim sürecine yansımalarını incelemeyi amaçlayan bu çalışmada tarama modeli benimsenmiştir. Mevcut çalışma iki adım takip edilerek gerçekleştirilmiştir. Uzaktan Eğitim Tutum Ölçeği önce Türkçe'ye uyarlanmış, ardından öğretmen adaylarına hem Uzaktan Eğitim Tutum Ölçeği hem de Uzaktan Eğitim Değerlendirme Ölçeği uygulanmıştır.

*Bulgular:* Cinsiyete göre öğretmen adaylarının tutumları DRDE boyutunda anlamlı bir farklılık göstermezken, EDE boyutunda istatistiksel olarak anlamlı bir farklılık bulunmuştur. Öğretmen adaylarının acil uzaktan eğitim sürecini değerlendirmeleri DP boyutunda anlamlı farklılık gösterirken, TE boyutunda farklılaşmamıştır. Yükseköğretimin birinci ve ikinci yıllarında acil uzaktan eğitime maruz kalan ve hâlihazırda üçüncü ve dördüncü sınıfta öğrenim görmekte olan öğrencilerin acil uzaktan eğitim tutumlarında anlamlı bir farklılık gözlenmemiştir. Benzer şekilde, çalışma programları açısından da bir fark yoktur.

*Önemli Vurgular:* Çalışmada uzaktan eğitim tutum ölçeği Türkçe'ye uyarlanmıştır. Bu bağlamda alana katkı sağlayacak bir çalışmadır. Öğretmen adaylarının acil uzaktan eğitim tutumlarını belirlemenin yanı sıra acil uzaktan eğitim sürecinde kendilerini de değerlendirmeleri önemlidir. Uzaktan eğitim tutum ölçeğinin Türkçe'ye uyarlanmasından sonra acil uzaktan eğitim değerlendirme ölçeği ile veri toplanarak öğretmen adaylarının durumları belirlenmeye çalışılmıştır. Araştırma sonucunda teknoloji okuryazarlığı becerisi gerektiren durumlarda cinsiyet, sınıf düzeyi veya bölüm bağlamında farklılaşmanın olmaması önemlidir.

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## INTRODUCTION

Noam (1995) states that people used to look for and get knowledge that was in universities, but in the future, knowledge would be available to people regardless of their position. Considering the present-day conditions after an important proposition about what changes would happen in education, it seems that the developments in technology have made it possible. With the developments in information and communication technologies (ICT), a rapid change has been observed in education at all levels across the world in the last 50 years. The pandemic has been one of the biggest challenges that education systems have ever dealt with (Daniel 2020). In educational institutions around the world, the transition to the distance education has happened almost overnight (UNESCO, 2020). The situation is described with the concept of emergency distance education that refers to the temporary transition of teaching, which is normally conducted face-to-face, online or in a blended manner, to alternative options due to a crisis (Ferri, Grifoni & Guzzo, 2020; Hodge et al., 2020). With the decision of distance education, 1.6 billion students in 191 countries around the world were subjected to the distance education process (Drane et al. 2020, UNESCO, 2020). This has radically changed the educational life not only for students who receive face-to-face education, but also for teachers (Lall & Singh, 2020). In this regard, teachers' attitudes towards distance education has gained importance.

### Attitudes Towards Distance Education

Attitude is defined as an individual's stance regarding an object, person or situation (Dündar et al., 2017). It reflects the behavior that has not yet been exhibited. Attitudes towards education are shaped by individuals' experiences in the subject area (Kaban, 2021). Research on attitudes towards distance education show that individuals have positive (Ağır, 2007; Bunk, Li, Smidt, Bidetti & Malize, 2015; Dündar et al., 2017; Kaban, 2021) or negative attitudes (Nasser & Abouchedid, 2000). In addition, the attitudes of individuals with positive thoughts about distance education are at moderate level (Ağır, 2007) and above the average (Dündar et al., 2017). Having a computer and Internet connection at home and the level of participation in virtual classes are stated to positively affect attitudes towards distance education (Kaban, 2021). University students have low levels of attitudes towards distance education (Barış, 2015; Kaban, 2021). Attitudes towards distance education have been examined in terms of gender, education level, having a computer and Internet connection, professional experience, major, age, education level, ICT competencies and institution. Findings in the literature show that attitudes towards distance education differ based on gender (Başar et al., 2019; Kaban, 2021) while other findings reveal no such difference (Ağır, 2007; Barış, 2015; Gündüz, 2013; Gündüzalp, 2021; Şimşek, İskenderoğlu & İskenderoğlu, 2010). Male teacher candidates have more positive perceptions of distance education than their female colleagues (Başar et al., 2019; Kaban, 2021). The level of education may also lead to a significant difference (Barış, 2015; Kaban, 2021) or no difference (Gündüzalp, 2021; Şimşek, İskenderoğlu & İskenderoğlu, 2010) in attitudes towards distance education. However, teachers' professional experience is stated to lead to a significant difference in their attitudes. Distance education attitudes of teachers with less professional experience are more positive (Ağır, 2007). In a study conducted with school principals and teachers, attitudes towards distance education were found to be negative for school principals, but positive for teachers (Nasser & Abouchedid, 2000). As for university staff, faculty members' attitudes towards distance education were observed to be affected by their motivation and teaching experience (Bunk, Li, Smidt, Bidetti & Malize, 2015). Faculty members with high intrinsic motivation and who have experience in distance education develop positive attitudes towards distance education. In another study on teacher candidates, experience in distance education were found to affect attitudes (Şimşek, İskenderoğlu & İskenderoğlu, 2010).

The attitude levels of those who have a computer, constant Internet access and a mobile device are higher (Barış, 2015). In other words, the use of technology is a key factor in these attitudes (Tabata & Johnsrud, 2008). Faculty members participate more in distance education if they have technical skills, and they improve their technical skills as they participate more. Having distance education skills facilitates participation in distance education. Technology usage and competencies can shape the attitudes of faculty members towards distance education. Attitudes towards distance education determine educators' behaviors in the instructional process (Gündüzalp, 2021).

For a successful implementation of distance education, teachers' attitudes are of great importance (Tzivinikou et al., 2020) and these attitudes are also reflected on students (Aydın & Sağlam, 2012). Teacher candidates studying in education faculties should thus be trained as individuals with positive attitudes towards distance education (Kışla, 2016). In the distance education process, it is important to determine and evaluate the attitudes of teachers towards distance education. Successful distance education can be possible with quality teachers (Tabata & Johnsrud, 2008). For distance education to be of high quality, teachers' digital literacy is also considerably important as well as their attitudes towards distance education. This is because ICT tools are employed in distance education environments. Woodcock et al. (2015) states that one of the most significant factors affecting teacher candidates' online learning-teaching competencies is their self-efficacy perceptions regarding these environments. Likewise, Hung (2016) considers the self-efficacy in using digital tools as an important factor that determines the readiness of teachers for online teaching.

### The Pandemic and Distance Education

Various definitions of distance education are available in the literature, and the phenomenon is thought to have emerged with the Internet, but took place in various forms before the Internet era (Moore & Kearsley, 2012). Keegan (1990) defines distance education as an educational activity based on the gathering of all stakeholders via communication technologies, although the

learner, the teacher, the learning material and the content are in different environments. Distance education makes the learner independent of time and place, the content is conveyed to the learner through technology by the teacher, and the communication between the learner and the teacher takes place through technology (Kidd & Song, 2007). Based on the definitions, distance education can be described as the realization of learning and teaching activities by means of various technological tools in situations where the student and the teacher are not face to face. Today, computer technologies can enable meaningful learning processes to be implemented from any distance under the structure of a student-teacher system (Bachmaier 2011).

In the last three decades, distance education has gained great importance and become more important during the pandemic process. With the pandemic, various distance education activities were implemented in 191 countries in order not to interrupt education (Yamamoto & Altun, 2020). In these practices, different tools, assignments, updated and structured content, and alternative education models were used to continue education that had to be interrupted at school (Zhao, 2020). The distance education process was started with decisions taken rapidly during the pandemic. The emergency remote education process has brought institutions, trainers and students face to face with various difficulties such as lack of technological tools, internet, socio-economic factors, and digital competence level. (OECD, 2021; UNESCO, 2021). For this reason, distance education carried out during the pandemic period is called emergency remote education. Bozkurt and Sharma (2020) define emergency remote education as a temporary shift of educational activities to an alternative delivery mode due to crisis conditions, unlike pre-pandemic distance education. Hodges et al. (2020) state that this process can be considered as a repair process that offers educational experiences that are not expected to be perfect. Bozkurt et al. (2020) distinguish between distance education and emergency remote education as follows:

- While emergency remote education is a necessity; distance education is an option.
- While trying to produce temporary solutions for the current need of emergency remote education; distance education, on the other hand, is to continue within the framework of lifelong learning and to try to produce permanent solutions.
- While trying to keep education alive with the resources at hand during the emergency remote education crisis; the theoretical and practical knowledge specific to the field of distance education does not make education sustainable with planned and systematic activities in line with a specific purpose.
- The concept of "emergency remote education", which is the English equivalent of the concept of emergency remote education, and "distance education", the English equivalent of the concept of distance education. Although the concept of distance is expressed with the same word in Turkish, the concept of "remote" emphasizes physical distance, while the concept of "distance" emphasizes physical, interactional, and psychological distance.

UNESCO (2020) made the following recommendations regarding the disruption of education and its effective implementation during the pandemic process:

- The most suitable tool should be chosen
- Distance education curricula should be included in the process
- Data privacy and security must be ensured
- Solutions for psychosocial difficulties should be prioritized before education
- A plan for the distance learning curriculum should be prepared
- Support should be provided to teachers and parents in the use of digital tools
- Suitable approaches should be combined and the number of applications and platforms should be limited
- Distance learning rules should be set and students' learning process should be monitored.
- The duration of distance learning units should be defined on the basis of students' self-regulation skills
- Communities should be formed and a connection be established between them

Considering these recommendations, it can be stated that teachers have a great responsibility throughout the distance education process. At this point, teachers' perceptions, attitudes, and levels of digital literacy by which they can use this environment are of great importance. The primary aim of this study is to examine teacher candidates' attitudes towards emergency remote education and their evaluations of the emergency remote education process. Based on this aim, the following research questions were addressed:

RQ1. Do the teacher candidates' attitudes towards emergency remote education differ based on:

a) gender,

b) year of study and

c) their program?

RQ2. Do the teacher candidates' evaluations of emergency remote education process differ based on:

a) gender,

b) year of study and

c) their program?

RQ3. Is there a relationship between the teacher candidates' attitudes towards emergency remote education and their evaluations of the emergency remote education process?

## METHOD

### Research Model

Survey model was adopted in this study that aimed to examine teacher candidates' perceptions of distance education and their reflections on the distance education process. This research model is more concerned with how opinions and features are distributed in the target universe or among individuals, rather than what they stem from (Fraenkel, Wallen, & Hyun, 2012). In survey studies, data are collected from an entire universe or from a sample in order to make an overall judgement about the universe (Creswell, 2014). In addition, in such studies, the research phenomena can be examined in the sample at a certain point in time by collecting data only once. The present study was conducted by following the steps represented in Figure 1.


**Figure 1. Steps followed in the study**

As is seen in Figure 1, the Distance Education Attitudes Scale was first adapted into Turkish, and then both the Distance Education Attitudes Scale and the Distance Education Evaluation (DEE) Scale were administered to the teacher candidates.

### Participants

In the study, the Distance Education Attitudes (DEA) scale was adapted into Turkish. For this purpose, permission was obtained from Tzivinikou, Charitaki and Kagkara (2021) to adapt the scale to the target language, which was followed by the adaptation process. The procedure laid out by Hambleton and Bollwark (1991) and Hambleton and Kanjee (1993) was employed to adapt the scale. Accordingly, the following steps were taken:

- translating the items into the target language,
- checking whether the items are equivalent to the original ones,
- testing the reliability and validity of the scale translated into the target language.

The participants were different in these three steps. After the items of the DEA scale were translated into the target language by the researchers, they were reviewed by three English language instructors working at a state university in Turkey. The scale that was revised based on their comments were also checked by two Turkish language experts for its language use and comprehensibility in the target language. In order to make sure that the translated items overlapped with the original ones, the scale was administered to 21 English language teacher candidates (14 female, 7 male) twice in a two-month interval, first in English and then in Turkish. After the final structure of the DEA scale was formed, the reliability and validity studies were conducted in the second phase of the study, shown in Figure 1. The information on the participants who took part in this phase is presented in detail below.

In the study, it was aimed to choose teacher candidates who were exposed to the distance education process at higher education level during the pandemic in order to examine the perceptions and evaluations of participants regarding distance education. Therefore, the participants of the study included teacher candidates studying their third and fourth years at the education faculty of a Turkish state university (Table 1).

**Table 1. Information on the participants of the study**

| Program | Year of Study | Gender | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Female (%, f) | | Male (%, f) | | | |
| Science Education | Third | 4 | 80% | 1 | 20% | 5 100% | 10 |
| | Fourth | 5 | 100% | - | - | 5 100% | |
| Mathematics Education | Third | 17 | 60.7% | 11 | 39.3% | 28 100% | 54 |
| | Fourth | 9 | 34.6% | 17 | 65.4% | 26 100% | |
| Preschool Education | Third | 20 | 80% | 5 | 20% | 25 100% | 50 |
| | Fourth | 17 | 68% | 8 | 32% | 25 100% | |
| Guidance and Psychological Counselling | Third | 24 | 55.8% | 19 | 44.2% | 43 100% | 83 |
| | Fourth | 29 | 72.5% | 11 | 27.5% | 40 100% | |
| Elementary Education | Third | 14 | 48.3% | 15 | 51.7% | 29 100% | 45 |
| | Fourth | 9 | 50.0% | 9 | 50.0% | 18 100% | |

| Program | Year of Study | Gender | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Female (%, f) | | Male (%, f) | | | |
| Social Studies Education | Third | 14 | 77.8% | 4 | 22.2% | 18 100% | 44 |
| | Fourth | 17 | 65.4% | 9 | 34.6% | 26 100% | |
| Turkish Language Education | Third | 9 | 52.9% | 8 | 47.1% | 17 100% | 45 |
| | Fourth | 19 | 67.9% | 9 | 32.1% | 28 100% | |
| **Total** | | 207 | | 126 | | | 333 |

As is seen in Table 1, a total of 333 teacher candidates studying in seven different teacher training programs participated in the study. Of these teacher candidates, 207 were female, and 126 were male. In this phase, teacher candidates studying English language teaching were not included as participants because they contributed to the process in which the translated and original items were checked if they were equivalents.

**Data Collection Tools**

In the study, data were collected with a data collection tool consisting of three parts. The first part contained three questions regarding the demographic characteristics of the teacher candidates. The second part consisted of the DEA scale developed by Tzivinikou, Charitaki and Kagkara (2021) and adapted into Turkish by the researchers. The DEA scale had 10 items on two factors, and a 4-point Likert scale. In the scope of adapting the scale into the target language, a confirmatory factor analysis (CFA) was conducted on the DEA scale. The values obtained as a result of this analysis are presented in Table 2.

**Table 2. Fit indices of the DEA scale**

| Fit indices | Good fit | Acceptable Fit | Observed Value | References |
|---|---|---|---|---|
| $\chi^2$ | $0 \le \chi^2 \le 2df$ | $2df < \chi^2 \le 3df$ | 51.87 | Tabachnick and Fidell, 2012 |
| p value | .05 < p ≤ 1.00 | .01 ≤ p ≤ .05 | 0.014 | Hoyle, 1995 |
| $\chi^2/df$ | $0 \le \chi^2 / df \le 2$ | $2 < \chi^2 / df \le 3$ | 1,620 | Schermelleh-Engel, Moosbrugger and Müller, 2003; Wheaton, Muthen, Alwin, and Summers, 1977 |
| RMSEA | 0 ≤ RMSEA ≤ .05 | .05 < RMSEA ≤ .08 | 0.056 | Browne and Cudeck, 1992; Hu and Bentler, 1999; Schreiber et al., 2006 |
| SRMR | 0 ≤ SRMR ≤ .05 | .05 < SRMR ≤ .10 | 0.079 | Hu and Bentler, 1999 |
| NFI | .95 ≤ NFI ≤ 1.00 | .90 ≤ NFI < .95 | 0.94 | Schermelleh-Engel, Moosbrugger and Müller, 2003; Tabachnick and Fidell, 2012 |
| NNFI | .97 ≤ NNFI ≤ 1.00 | .95 ≤ NNFI < .97 | 0.95 | Hu and Bentler, 1999 |
| CFI | .97 ≤ CFI ≤ 1.00 | .95 ≤ CFI < .97 | 0.96 | Hu and Bentler, 1999; Tabachnick and Fidell, 2012 |
| $\chi^2$=51.87; *df* =32.01 | | | | |

The fit indices for all values were found to be within the expected ranges. As a result of CFA, it was determined that the fit indices of the DEA scale were within the range acceptable in the literature.

In the third part of the data collection tool, the DEE scale developed by Özkul et al. (2020) was used. The DEE scale consisted of 15 items on two factors. The item-total correlation coefficients of the factors in the scale that was developed with 600 teachers and administrators ranged between .55 and .87, while the internal consistency (Cronbach's Alpha) coefficients were between .96 and .89. In order to make sure that the DEE scale developed with teachers would be reliable and valid when it was used with teacher candidates, CFA was also performed on the DEE scale, and the fit values were obtained and presented in Table 3.

**Table 3. Fit indices of the DEE scale1**

| Fit indices | Good fit | Acceptable Fit | Observed Value | References |
|---|---|---|---|---|
| χ2 | 0 ≤ χ2 ≤ 2df | 2df < χ2 ≤ 3df | 278.42 | Tabachnick and Fidell, 2012 |
| p value | .05 < p ≤ 1.00 | .01 ≤ p ≤ .05 | 0 | Hoyle, 1995 |
| χ2/df | 0 ≤ χ2 / df ≤ 2 | 2 < χ2 / df ≤ 3 | 3.12 | Schermelleh-Engel, Moosbrugger and Müller, 2003; Wheaton, Muthen, Alwin, and Summers, 1977 |
| RMSEA | 0 ≤ RMSEA ≤ .05 | .05 < RMSEA ≤ .08 | 0.08 | Browne and Cudeck, 1992; Hu and Bentler, 1999; Schreiber et al., 2006 |
| SRMR | 0 ≤ SRMR ≤ .05 | .05 < SRMR ≤ .10 | 0.073 | Hu and Bentler, 1999 |
| NFI | .95 ≤ NFI ≤ 1.00 | .90 ≤ NFI < .95 | 0.95 | Schermelleh-Engel, Moosbrugger and Müller, 2003; Tabachnick and Fidell, 2012 |
| NNFI | .97 ≤ NNFI ≤ 1.00 | .95 ≤ NNFI < .97 | 0.96 | Hu and Bentler, 1999 |
| CFI | .97 ≤ CFI ≤ 1.00 | .95 ≤ CFI < .97 | 0.97 | Hu and Bentler, 1999; Tabachnick and Fidell, 2012 |
| χ2=278.42; df =89,23 | | | | |

The fit indices of all values were within the expected ranges. The values as a result of CFA showed that the NFI and CFI values were in the range of good fit, while the other values were also in the range of acceptable fit. The descriptive statistics of the data collection tools are presented in Table 4 on the basis of factors.

**Table 4. Descriptive statistics of the participants' answers2**

| Scales | Factors | $\bar{X}$ | SD | Skewness | Kurtosis |
|---|---|---|---|---|---|
| Distance Education Attitudes Scale (4-point Likert) | Efficacy of Distance Education (EDE) | 2.196 | 0.568 | 0.339 | 0.382 |
| | Difficulties Related to Distance Education (DRDE) | 2,736 | 0.56 | -0.48 | 0.77 |
| Distance Education Evaluation Scale (5-point Likert) | Technical Issues (TI) | 3,189 | 0.812 | -0.013 | -0.421 |
| | Learning Process (LP) | 2,078 | 0.811 | 0.62 | -0.078 |

For univariate normality, the limit skewness value is accepted as ±3, and the kurtosis value as ±10 (Kline, 2012). In this sense, the skewness values were between -.480 and .620, and the kurtosis values between -.421 and .770. Accordingly, the data collected with both scales were accepted to have provided the assumptions for univariate normality.

**Data Collection Process**

In the study, the adaptation of the DEA scale was firstly conducted and this was done in the spring semester of the 2021-2022 academic year. The items translated into the target language were presented to English language instructors through a form prepared by the researchers and their feedback was obtained.

| Orijinal Maddeler | |
|---|---|
| 1 | My participation in distance education programs during COVID-19 crisis is satisfactory |
| 2 | I cope with difficulties in Distance education rather than traditional education |

| Maddelerin Türkçeye Uyarlanmış Halleri | | Madde Çevirisi Uygundur | Düzenlenmeli |
|---|---|---|---|
| 1 | Kovid-19 krizinde uzaktan eğitim programlarına katılımın memnun ediciydi. | | |
| 2 | Geleneksel eğitimden ziyade uzaktan eğitimde zorlukların üstesinden geliyorum. | | |

**Figure 2. Expert opinion form for translated items1**

As is seen in Figure 2, the form included the original version of the items and the translated version in the target language. The experts were asked to state whether the translation was appropriate or should be edited. They stated their suggestions in the parts with the Turkish translations. The items that were translated into Turkish were also checked by Turkish language experts by using a form shown in Figure 3.

| Maddelerin Türkçeye Uyarlanmış Halleri | | Madde Çevirisi Uygundur | Düzenlenmeli |
|---|---|---|---|
| 1 | Kovid-19 krizinde uzaktan eğitim programlarına katılımım tatmin ediciydi. ..... ..... | | |
| 2 | Geleneksel eğitimin aksine uzaktan eğitimde zorluklarla başa çıkarım. ..... ..... | | |

**Figure 3. Expert opinion form for language use in Turkish**

Turkish language experts were asked to state whether the language use was appropriate or needed editing. For items that they thought needed editing, they were asked to offer suggestion, and in this way the translation of the items into the target language was finalized. In order to see whether the items were equivalent or not, a form was prepared in Google Forms and administered to students. Since the equivalence of the items was being checked, student number and gender information were collected as demographic information. The reason for taking the student numbers is that the English and Turkish forms of the scale would be administered in a two-week interval and the answers given were to be compared.

After having the final version of the adapted DEA scale, a data collection tool consisting of three parts was prepared by using a word processor. Data were collected from students (i.e. teacher candidates) studying their third and fourth years in seven different teacher training programs. In this step, the collection was done by pen-and-paper forms because the response rates in digital platforms were low.

**Data Analysis**

The data were analysed in accordance with the research questions. The data analysis process is summarized in Table 5.

**Table 5. Data analysis3**

| Research Question | Data collection tool | Data Analysis |
|---|---|---|
| **RQ1.** Do the teacher candidates' attitudes towards distance education differ based on:<br>**a)** gender,<br>**b)** year of study and<br>**c)** their program? | Distance Education Attitudes Scale | Independent Samples t-Test, Analysis of Variance (ANOVA) |

| Research Question | Data collection tool | Data Analysis |
|---|---|---|
| **RQ2.** Do the teacher candidates' evaluations of distance education process differ based on:<br>**a)** gender,<br>**b)** year of study and<br>**c)** their program? | Distance Education Evaluation Scale | Independent Samples t-Test, Analysis of Variance (ANOVA) |
| **RQ3.** Is there a relationship between the teacher candidates' attitudes towards distance education and their evaluations of the distance education process? | Distance Education Attitudes Scale<br>Distance Education Evaluation Scale | Correlation |

In data analysis, %, $f$, $\bar{X}$, t-test, ANOVA and correlation were used to analyse the data collected. The effect size was also included, and the effect size values were interpreted based on Cohen (1988).

#### Research Ethics

The study was carried out with the permission of the Scientific Research and Publication Ethics Committee at Muş Alparslan University (Permission no: 13.10.2022-67409).

## FINDINGS

In this study examining teacher candidates' attitudes towards distance education and their evaluations of the distance education process, the findings are presented and discussed in this section in parallel with the research questions.

#### The teacher candidates' attitudes towards distance education based on gender

T-test was used to determine whether the teacher candidates' attitudes towards distance education differed based on gender. The male participants ($\bar{X}_{EDE}$=2.349; $\bar{X}_{DRDE}$=2.789) had a higher mean than their female peers ($\bar{X}_{EDE}$=2.103; $\bar{X}_{DRDE}$=2.704) in both factors of the scale. However, the difference in the DRDE dimension was not large and the only statistically significant difference was in the EDE dimension ($t_{(239,487)}$=-3.911; p<0.05; $\eta^2$= .031). The effect size in this dimension was found to be low.

#### The teacher candidates' attitudes towards distance education based on year of study

The teacher candidates' attitudes towards distance education were examined to see whether there was a difference based on their year of study. No statistically significant difference was observed between the third-year ($\bar{X}_{EDE}$=2.193; $\bar{X}_{DRDE}$=2.684; $t_{(330,969)}$=-.072; p<0.05) and fourth-year students ($\bar{X}_{EDE}$=2.198; $\bar{X}_{DRDE}$=2.787; $t_{(329,464)}$=-1.672; p<0.05).

#### The teacher candidates' attitudes towards distance education based on program

The distribution of the teacher candidates in the context of the EDE and DRDE dimensions was examined based on their study programs (Table 6).

**Table 6. Descriptive statistics of scores in the DEA scale based on programs4**

| Departments | Efficacy of Distance Education (EDE) | Difficulties Related to Distance Education (DRDE) |
|---|---|---|
| Science Education | $\bar{X}$=2.183; sd=.552 | $\bar{X}$=2.850; sd=.567 |
| Mathematics Education | $\bar{X}$=2.250; sd=.541 | $\bar{X}$=2.717; sd=.502 |
| Preschool Education | $\bar{X}$=2.166; sd=.651 | $\bar{X}$=2.775; sd=.479 |
| Guidance and Psychological Counselling | $\bar{X}$=2.174; sd=.543 | $\bar{X}$=2.792; sd=.514 |
| Elementary Education | $\bar{X}$=2.305; sd=.572 | $\bar{X}$=2.718; sd=.609 |
| Social Studies Education | $\bar{X}$=2.162; sd=.546 | $\bar{X}$=2.653; sd=.624 |
| Turkish Language Education | $\bar{X}$=2.125; sd=.587 | $\bar{X}$=2.688; sd=.676 |

The difference in the teacher candidates' attitudes towards distance education based on their programs was analysed by using analysis of variance. The results showed no significant differences in the EDE ($F_{(6,326)}$=.545; p<0.001) and DRDE ($F_{(6,326)}$=.474; p<0.001) dimensions based on the study programs of the teacher candidates.

#### The teacher candidates' evaluations of the distance education process based on gender

T-test was used to determine whether the teacher candidates' evaluations of the distance education process differed based on gender. The male participants ($t_{TI}$=3.195; $t_{LP}$=2.262) had a higher mean than their female peers ($t_{TI}$=3.186; $t_{LP}$=1.965) in both

dimensions. However, the difference in the TI dimension was not large and the only statistically significant difference was in the LP dimension ($t_{(235,566)}$=-3.287; p<0.05; $\eta^2$= .031). The effect size in this dimension was found to be low.

**The teacher candidates' evaluations of the distance education process based on year of study**

The teacher candidates' evaluations of the distance education process were examined to see whether there was a difference based on their year of study. No statistically significant difference was observed between the third-year ($\bar{X}_{TI}$=3.196; $\bar{X}_{LP}$=2.051; $t_{(330,974)}$=.139; p<0.05) and fourth-year students ($\bar{X}_{TI}$=3.183; $\bar{X}_{LP}$=2.103; $t_{(325,958)}$=-.584; p<0.05).

**The teacher candidates' evaluations of the distance education process based on program**

The distribution of the teacher candidates in the context of the TI and LP dimensions was examined based on their study programs (Table 7).

**Table 7. Descriptive statistics of scores in the DEE scale based on programs5**

| Departments | Technical Issues (TI) | Learning Process (LP) |
|---|---|---|
| Science Education | $\bar{X}$=3.433; sd=.991 | $\bar{X}$=2.022; sd=.877 |
| Mathematics Education | $\bar{X}$=3.240; sd=.825 | $\bar{X}$=2.160; sd=.713 |
| Preschool Education | $\bar{X}$=3.063; sd=.770 | $\bar{X}$=2.060; sd=.911 |
| Guidance and Psychological Counselling | $\bar{X}$=3.291; sd=.795 | $\bar{X}$=1.954; sd=.718 |
| Elementary Education | $\bar{X}$=3.258; sd=.885 | $\bar{X}$=2.297; sd=.817 |
| Social Studies Education | $\bar{X}$=3.015; sd=.751 | $\bar{X}$=2.042; sd=.800 |
| Turkish Language Education | $\bar{X}$=3.125; sd=.806 | $\bar{X}$=2.044; sd=.946 |

The difference in the teacher candidates' evaluations of the distance education process based on their programs was analysed by using analysis of variance. The results showed no significant differences in the teacher candidates' evaluations of the distance education process based on their programs departments in the TI ($F_{(6.326)}$=1.045; p<0.001) and LP dimensions ($F_{(6.326)}$=1.027; p<0.001) factors.

**The relationship between the teacher candidates' attitudes towards distance education and their evaluations of the distance education process**

The last phase of the study included an analysis of the relationship between the teacher candidates' attitudes towards distance education and their evaluations of the distance education process. Correlation analysis was conducted for this purpose and the findings are presented in Table 8.

**Table 8. The relationship between attitudes towards distance education and evaluations of the distance education process6**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| EDE[1] | 1 | | | |
| DRDE[2] | .528** | 1 | | |
| TI[3] | .348** | .511** | 1 | |
| LP[4] | .633** | .322** | .381** | 1 |

Correlation is significant at the 0.01 level (2-tailed).**

As is seen in Table 8, there was a positive relationship between the teacher candidates' attitudes towards distance education and their evaluations of the distance education process. While the relationships between the EDE and the TI dimensions (r=.348; p<.001), between the DRDE and the LP dimensions (r=.322; p<.001) and between the TI and the LP dimensions (r=.381; p<.001) were weak, there was a moderate-level relationship between the DRDE and TI dimensions (r=.511; p<.001) and a strong relationship between the EDE and LP dimensions (r=.633; p<.001).

## DISCUSSION & CONCLUSION

In the present study, teacher candidates' attitudes towards distance education and evaluations of the distance education process were examined in terms of different variables. Based on gender, the teacher candidates' attitudes showed no significant in the DRDE dimension while there was a statistically significant difference in the EDE dimension. The items in the DRDE dimension required digital literacy skills. Considering the age of the participants from which data were collected, the target population can be defined as the Generation Z, digital native or the alpha generation. In this sense, it can be argued that the target group can cope with the technological difficulties they may encounter in the distance education process, depending on the level of digital

literacy. The EDE dimension was about views on distance education, and the answers to the items in this dimension showed a significant difference based on gender.

The teacher candidates' evaluation of the distance education process significantly differed in the LP dimension, but did not in the TI dimension. The items in the TI (technical issues) dimension) required digital literacy skills like those items in the DRDE dimension. The teacher candidates' having high levels of digital literacy could be the reason why there was no significant difference. However, a significant difference was revealed in the LP dimension and the male teacher candidates were observed to be more active in the process. When the data collected with both measurement tools are considered together, there seems to be no difference in terms of digital literacy. Studies reporting findings based on self-reports show that men seem to be advantageous in the context of attitudes and competencies regarding technology, but a statistically significant difference can be observed in favor of women when performance is taken into account (Siddiq & Scherer, 2019). In this respect, the finding that there was no significant difference between men and women in dimensions that require digital literacy can be regarded as normal. In their study using a measurement tool that has sub-dimensions such as personal suitability, effectiveness, instructiveness and disposition, Duzgun and Sulak (2020) stated that the views of teacher candidates on distance education practices did not differ based on gender. In another study, Bayram, Peker, Aka and Vural (2019) examined attitudes towards distance education in terms of advantages and limitations and did not report a significant difference for advantages based on gender. Gökbulut (2021) similarly found that there was no significant difference between distance learning students' perceptions of distance education and its sub-factors based on gender.

No significant difference was observed in the distance education attitudes of the students who were exposed to distance education in the first and second years of higher education and who are currently studying their third and fourth years. In a similar vein, there was no difference in terms of their study programs. With regard to the technical issues and learning process included in the second measurement tool, the teacher candidates' perceptions did not differ based on year of study and program. In other words, year of study and program were not predictors of scores in the DEA and DEE scales, and did not lead to a significant difference in the sample. Barış (2015) examined undergraduate students' attitudes towards distance education in the context of gender and program, and found that the students' attitude scores were low. Yalman and Kutluca (2013) also did not report a significant difference in mathematics teacher candidates' attitudes towards distance education in terms of gender and program. Karatepe, Küçükgencay and Peker (2020) found that mathematics, science and elementary school teacher candidates' perceptions of synchronous education did not show a significant difference based on major. However, Yenilmez, Balbağ and Turgut (2017) stated that there was a difference in science and elementary school teachers' attitudes towards distance education. Duzgun and Sulak (2020) reported that teacher candidates' views on distance education practices differed based on year of study, but not on study program. Likewise, Bayram, Peker, Aka and Vural (2019) did not report a significant difference in attitudes towards distance education in terms of year of study.

Following the interpretation of the findings revealed as a results of data analysis, suggestions for practitioners and researchers are offered in the present study.

#### Suggestions for practitioners

The results of the study showed that the teacher candidates' attitudes towards distance education did not significantly differ based on the DRDE dimension, but they did in the EDE dimension. While there were items that require digital literacy in the DRDE dimension, there were items that reveal views on distance education in the EDE dimension. In order to enhance the views of teacher candidates on distance education, university instructors have a great responsibility in courses taught online. Instructors can design and present distance education processes based on instructional design models.

In another measurement tool used in the scope of the study, the teacher candidates were asked to evaluate themselves for the technical issues and learning process. There was no significant difference in the technical dimensions based on gender, but a difference was observed in the teacher candidates' participation in the learning process. In this context, an environment in which teacher candidates can actively participate in the learning process in distance education should be designed, and in these environments, they should be able to participate in the learning process easily.

#### Suggestions for researchers

In the study, no significant differences in the teacher candidates' attitudes were observed in the DRDE and EDE dimensions based on program and year of study. Researchers can examine the reasons for this result by conducting experimental studies at different years of study or programs.

The teacher candidates who evaluated themselves in the distance education process did not differ in the dimensions of technical issues and learning process in terms of program and year of study. In this regard, researchers can study teacher candidates from different years of study or programs.

## Declaration of Conflicting Interests

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## Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

## Statements of publication ethics

We hereby declare that the study has no unethical issues and that research and publication ethics have been observed carefully.

## Ethics Committee Approval Information

The study was carried out with the permission of the Scientific Research and Publication Ethics Committee at Muş Alparslan University (Permission no: 13.10.2022-67409).

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## Appendix

**Appendix 1.** The DEA Scale's Turkish Form

| | | Kesinlikle Katılmıyorum | Katılmıyorum | Katılıyorum | Kesinlikle Katılıyorum |
|---|---|---|---|---|---|
| 1 | Salgın döneminde uzaktan yapılan derslere katılım sürecim tatmin ediciydi. | 1 | 2 | 3 | 4 |
| 2 | Geleneksel eğitimin aksine uzaktan eğitimde zorluklarla başa çıkarım. | 1 | 2 | 3 | 4 |
| 3 | Uzaktan eğitimin geleneksel eğitimle aynı düzeyde etkili olduğunu düşünürüm. | 1 | 2 | 3 | 4 |
| 4 | Dijital materyaller kullanmadaki zorluklarla başa çıkarım. | 4 | 3 | 2 | 1 |
| 5 | Eşzamanlı/senkron görüşme sürecindeki zorluklarla başa çıkarım. | 4 | 3 | 2 | 1 |
| 6 | Canlı ders/Eşzamanlı görüşme sürecinde dersin hocası ile etkileşim kurabilirim. | 1 | 2 | 3 | 4 |
| 7 | Uzaktan ve geleneksel eğitimde öğrenme çıktılarına eşit şekilde ulaşabileceğimi düşünürüm. | 1 | 2 | 3 | 4 |
| 8 | Uzaktan eğitime katılmak için uygun becerilere sahibim. | 1 | 2 | 3 | 4 |
| 9 | Uzaktan eğitime ve geleneksel eğitime katılma motivasyonum aynı düzeydedir. | 1 | 2 | 3 | 4 |
| 10 | Gelecekte uzaktan öğrenme programlarına katılmayı isterim. | 1 | 2 | 3 | 4 |

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| Research Article / Araştırma Makalesi |

# An Investigation of Uncertainty Intolerance and Uncertainty Management Research in Educational Institutions: Meta-Analysis Study

# Eğitim Kurumlarında Belirsizlik Tahammülsüzlüğü ve Belirsizlik Yönetimi Araştırmalarının İncelenmesi: Meta Analiz Çalışması

**Savaş Varlık**[1]

**Keywords**

1. Intolerance of uncertainty
2. Uncertainty management
3. Meta-Analysis
4. Teacher

**Anahtar Kelimeler**

1. Belirsizlik tahammülsüzlüğü
2. Belirsizlik Yönetimi
3. Meta-Analiz
4. Öğretmen

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## Abstract

*Purpose:* In this meta-analysis study, it was aimed to analyze uncertainty intolerance and uncertainty management researches in educational institutions using meta-analysis method.

*Design/Methodology/Approach:* This research was carried out as a type of group comparison meta-analysis, which is one of the types of meta-analysis. In the meta-evaluation, eight studies that met the inclusion criteria were reached. By combining these studies, a study was conducted on 2704 sample groups. In determining the meta-analysis model type of the research, first a funnel plot diagram was drawn for a general impression of publication bias, and then statistical calculations were carried out to reach a real conclusion. As a result of the diagram and statistical calculations, it was decided that there was no publication bias in the studies included in the meta-analysis. After determining that there was no publication bias, heterogeneity test was performed for model selection.

*Findings:* As a result of the analysis, it was decided to interpret the meta-analysis according to the random effects model. Title and publication type were determined as moderators for heterogeneity. As a result of the meta-analysis, it was found that research into intolerance of uncertainty and uncertainty management in educational institutions had an average effect, the moderator effect of the theses was higher in the calculations regarding the moderator effect, and the titles of teachers and education administrators did not have any moderator effect in the title variable.

*Highlights:* It was seen that the number of empirical studies on uncertainty intolerance and uncertainty management in educational institutions was few. It was determined that the studies could not provide the big picture of uncertainty management, even the effect sizes of the studies were not calculated in any of the studies, and a statistical conclusion could not be reached on whether the teachers' intolerance of uncertainty and uncertainty management perceptions work in practice. Therefore, the need to synthesize results on the effectiveness of intolerance of uncertainty and uncertainty management research emerged.

## Öz

*Çalışmanın Amacı:* Bu meta analiz çalışmasında, eğitim kurumlarında belirsizlik tahammülsüzlüğü ve belirsizlik yönetimi araştırmalarının meta analiz yöntemiyle incelenmesi amaçlanmıştır.

*Materyal ve Yöntem:* Bu araştırma meta analizin türlerinden grup karşılaştırma meta analiz türü olarak yürütülmüştür. Meta değerlendirmede araştırmaya dahil edilme kriterlerini sağlayan sekiz araştırmaya ulaşılmıştır. Bu araştırmaların birleştirilmesiyle 2704 örneklem grubu üzerinde çalışma yapılmıştır. Araştırmanın meta analiz model türünün tespitinde önce yayım yanlılığına ilişkin genel bir izlenim için funnel plot diyagramı çizilmiş daha sonra gerçek bir kanıya varabilmek için istatistiki hesaplamalar yapılmıştır. Diyagram ve istatistiki hesaplamalar sonucunda meta analize dahil edilen çalışmalarda yayım yanlılığının olmadığına karar verilmiştir. Yayım yanlılığının olmadığının saptanmasında sonra model seçimi için heterojenlik testi yapılmıştır.

*Bulgular:* Analiz sonucunda meta analizin rastlantısal etkiler modeline göre yorumlanmasına karar verilmiştir. Heterojenlik için moderatör olarak unvan ve yayım türü belirlenmiştir. Meta analiz sonucunda eğitim kurumlarında belirsizlik tahammülsüzlüğü ve belirsizlik yönetimi araştırmalarının ortalama bir etkiye sahip olduğu, moderatör etkiye ilişkin yapılan hesaplamalarda tezlerin moderatör etkisinin daha yüksek olduğu, unvan değişkeninde ise öğretmen ve eğitim yöneticisi unvanlarının herhangi bir moderatör etkisinin olmadığı bulgusuna ulaşılmıştır.

*Önemli Vurgular:* Eğitim kurumlarında belirsizlik tahammülsüzlüğü ve belirsizlik yönetimine ilişkin yapılan amprik çalışmaların sayısının çok az olduğu görülmüştür. Yapılan çalışmaların da belirsizlik yönetimine ilişkin büyük resmin görülmesini sağlayamadığı, hatta çalışmaların hiçbirinde çalışmalara ilişkin etki büyüklüklerinin hesaplanmadığı, öğretmenlerin belirsizliğe tahammülsüzlük ile belirsizlik yönetimi algılarının pratikte işe yarayıp yaramadığına ilişkin istatistiki olarak bir sonuçla yorumlanıp yargıya varılamadığı saptanmıştır. Bu nedenle belirsizliğe tahammülsüzlük ve belirsizlik yönetimi araştırmalarının etkililiğine ilişkin sonuçların sentezlenmesi ihtiyacı ortaya çıkmıştır.

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## INTRODUCTION

When traditional organization theories are examined, it will be seen that there is a relationship between the concept of rationality and the concept of uncertainty. Taylor aimed to eliminate organizational uncertainty and to make certainty dominant by introducing scientific management. Weber tried to present the organization clearly with his bureaucratic model. For this reason, uncertain processes contradict traditional organizational theories (McPhee & Zaug, 2001). Uncertainty is a model that fits the contingency theory. In this context, it is necessary to consider the concept of uncertainty as a structure that reveals the relationship between organizations and their environments. Although today's technological infrastructure is getting stronger, not all technological infrastructure can offer us a planned life, but it also reveals many uncertainties (Campitt & Williams, 2004). It is seen that it is not easy to draw the framework of the knowledge, skills and working conditions required by the job in today's organizations. Since the individual is frequently exposed to situations such as lack of communication, blurred information, missing data, change, and transformation, the individual also tries to learn to struggle with these, and encounters many events that he/she cannot foresee in his work and private life (Lind & Van den Bos, 2002). The individual who encounters these events, called uncertainty, tries to manage or reduce them with creativity, initiative and using the current situations more effectively and efficiently (Küçükkömürler, 2017). There are some principles and ways to be followed in the process in order to manage uncertainty. According to Smithson (2008), one should first start with the understanding of uncertainty. Uncertainty must be identified, estimated, and quantified. It must then be reduced or eliminated, and then accepted or endure against uncertainty. Finally, it must be controlled or exploited. In this way, it was revealed how uncertainty was perceived by individuals. With the diversification of the reactions shown, uncertainty was tried to be managed by the decision makers.

In the literature, it is seen that strategies and methods belonging to different disciplines regarding the ways of coping with uncertainty have been developed, but since this research was carried out in the field of educational sciences, information on the ways of coping with this field was included. In the related literature, the concepts of "flexibility, planning scenarios, awareness of patterns, leading a guide, being resistant, being agile, strategic readiness, transparency, governance, cooperation, imitative transformation" were evaluated in the related literature. Organizations that develop and consciously increase the understanding of having a flexible approach are successful. Flexible planning of organizations against innovations, changes and uncertainties they encounter contributes to the growth and development of organizations (Syrett & Devine, 2014). Studies have also shown that maintaining the flexibility of organizations does not adversely affect their functional performance when faced with uncertainty (Silva & Ferreria, 2017). Therefore, organizations that adopt the understanding of flexibility learn to optimize the processes of achieving their work purpose and adapt in the face of unexpected events (Teece, Peteraf & Leih, 2016). Apart from the flexible approach, it is also important to establish patterns that guide employees and managers in organizations and strengthen awareness. According to Syrett & Devine (2014), establishing a pattern strengthens employee awareness. Managers and employees who cannot establish a pattern are likely to make mistakes in a large number of information flows. Social economic, political trends, developments in the markets, competitors, stakeholder status etc. İn almost every situation we try to make sense of it. According to Gifford, Bobbitt & Slocum (1979), establishing a pattern reduces ambiguities and confusion. The establishment of patterns also serves as a guide to employees and managers about what existing knowledge means. Even decision-making managers can make rational decisions in cooperation thanks to the established patterns.

According to Syrett & Devine (2014), through collaboration, they can reach beyond the organizational boundaries and understand the sources of uncertainty. Collaboration can help create a new perspective. In situations of uncertainty, close relationships with all stakeholders and other organizations can provide important opportunities. Collaboration is a useful way to learn to live with uncertainty. It enables organizations to connect internally and externally. For this, it is necessary for decision makers to listen to individuals, to hear them, to work together and to increase their level of strategic readiness. Because time passes quickly and organizations are faced with sudden changes. According to Armenakis, Harris & Mossholder (1993), managers who can lead change need to ensure their members' strategic readiness in cooperation. Organization managers need the inspiration, energy and support they need to ensure their members are ready, and this can only be achieved through collaboration. Managers who want to ensure strategic readiness should take initiatives to realize the beliefs, goals, attitudes of their members and the behaviors expected at the end of the change.

According to Lind & Van den Bos (2002), organizations need to plan scenarios that will help them in order to capture a context in the face of unexpected emergencies and create a framework against desired situations. In order to do this, they need to create a context for the known and a tool to explore possibilities for the unknown. The main purpose here is to change and challenge the rules of the game against unexpected situations. It can be thought that if used in educational organizations, it will help to give innovative responses to future challenges. Syrett & Devine (2014) states that with scenario planning, the results and outputs to be obtained by the organization can be examined comprehensively, and then possible reactions can be determined. It is a good way to make scenario plans for organizations. Against the uncertainties to be encountered in the future, it is acted with many foresights. According to Teece, Peteraf & Leih (2016), the main purpose behind scenario planning is to reveal many unforeseen possible outcomes. Scenarios do not aim to fix the future, but they can provide opportunities for managers to avoid overlooked areas.

According to Van de Vrande, Vanhaverbeke & Duysters (2009), it is important to maintain a flexible approach and to establish a less hierarchical organizational structure in high uncertainty situations. One of the main reasons for the uncertainties

experienced within organizations is the problem of cooperation and coordination among the members. In order to overcome this, it is important to cooperate with all members as a requirement of the concept of governance, and to be transparent and accountable. As a result of transparency and cooperation, members' sense of ownership and trust in the organization will increase. According to Syrett & Devine (2014), transparency and accountability are vital not only in governance but also in uncertainty management. Misuse and misuse of the organization's functioning, money, technology and human resources will lead to misunderstanding and uncertainty among its members. Cicero, Pierro & Knippenberg (2010) state that it is important for managers to give confidence to their employees and to see them as a group member in environments of uncertainty. Rayner (2018) also states that the members of the organization should be seen in a safe environment and as a group member, and that education managers should not overlook these issues. Educational administration is not a prestige-raising profession, but an effort to reach the determined goals of the organization in the midst of uncertainty and disorder, in a calm and transparent manner. Syrett & Devine (2014) say that organizations need guiding managers. Guide managers give the organization trust, are transparent and accountable, provide good governance, encourage rational decision-making, and involve employees at all levels.

Today, competitive understandings and technological innovations in the world require organizations to be active and dynamic in order to survive. It is necessary to design the inside and outside of the organization in accordance with the changing market conditions, to stay ahead of time and not to fall behind (Wu, Tseng, Chiu & Lim, 2016). A dynamic organization acts swift even under conditions of uncertainty. Agility is an important feature for managing uncertainty, and even a valuable tool for competent managers in the face of high uncertainty (Teece, Peteraf & Leih, 2016). Apart from swiftness, flexibility is important for the organization. Flexibility is the work of constructing any setback or difficulty in its own way, adopting it and coping with the changes experienced. By providing flexibility, learning to live with change and uncertainties, increasing options, having knowledge about problem solving, and self-organization develops (Berkes, 2007). When organizations face uncertainty, they try to minimize the costs of seeking information and imitate other organizations (Haveman, 1993). Imitative transformation is an effective organizational response to uncertainty, but copycat mentality should be considered as a last resort. Imitation of past behaviors may also cause new behaviors to be legitimated (Henisz, & Delios, 2001). These actions, behaviors and practices can be institutionalized, and other members and managers in the organization can apply and adopt the established institutionalized course of action without thinking (Haveman, 1993). According to Dequech (2003), imitative transformation should be considered as the last resort if the organization cannot access information during periods of change and transformation, because methods and techniques in another organization may not meet the needs of another. If the imitated information is not rational, it will not go beyond sharing ignorance, and therefore the organization will not be able to develop. For this reason, managers in organizations need uncertainty management competencies. Uncertainty management competencies are given in Figure 1.

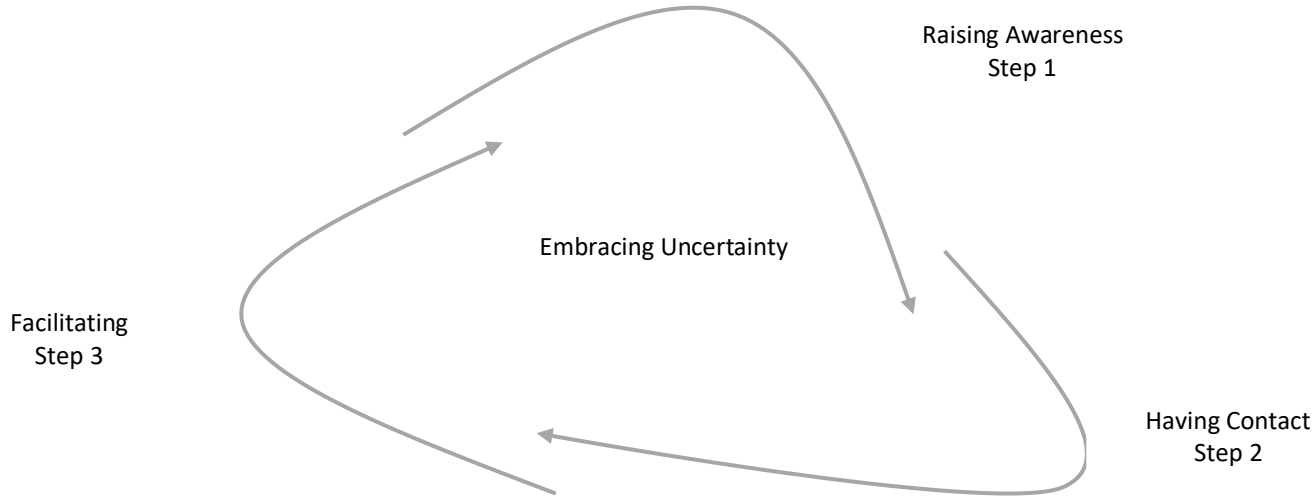


**Figure 1. Uncertainty management competencies**

When the uncertainty management competencies are examined in detail in Figure 1, according to Clampitt, Williams & DeKoch (2001), this model is to move away from the traditional decision-making approach. The first step of the model is to create awareness of uncertainty, the second step is to communicate about uncertainty, and the third step is to facilitate it with a catalyst effect. While these competencies can be learned and understood separately, their value will emerge when applied simultaneously. Therefore, managers should not only change organizational policies, procedures, behaviors, but also coordinate these activities in a meaningful way. It is the manager's ability to quickly implement the steps when it is time to adjust the competence here. The way to be an effective manager depends on the ability to cope with uncertainty and the resulting cognitive-affective response. Managers who can keep the experience of uncertainty at a tolerable level can have more choices and embrace opportunities (White & Shullman, 2010). However, in today's modern organizations, it seems very difficult for managers to strictly manage uncertainty with the traditional approach. Uncertainty management with the traditional approach is given in Figure 2.


**Figure 2. Uncertainty management with traditional approach**

When the uncertainty management with the traditional approach is examined in detail in Figure 2, according to Clampitt & Williams & (2004), this model is first planned by many managers in the traditional approach and then applied by thinking in a linear way. Organizations using this approach often lack the flexibility to adapt quickly to changing conditions. The pace of change today is quite high. The rate of change in comparison to the old centuries has increased about four thousand times today. Therefore, leaders who can solve complex issues under uncertainty are needed. Because complex things need less traditional managers (Obolensky, 2014). According to Levine & Wiener (1989), coping is the reduction or elimination of physiological responses produced as a result of uncertainty. The main function of the coping process, which includes control, feedback and predictability, is to reduce uncertainty. Therefore, we must learn to plan for possibilities in the face of uncertainty. Exploring possibilities and tolerating uncertainty is an important way of embracing uncertainty (Clampitt, Williams & DeKoch, 2001).

Individuals' reactions to uncertainty intolerance show their tolerance levels. Tolerance of uncertainty is a powerful concept that are measured in different ways by different disciplines. Each individual's degree of acceptance, acceptance and rejection of uncertainty differs from each other (Clampitt & Williams, 2000). The opposite of uncertainty tolerance is intolerance of uncertainty, individuals who cannot tolerate uncertainty will also find they cannot accept that most aspects of life are uncertain. Such individuals experience extreme anxiety, fear and anxiety under uncertainty (Buhr & Dugas, 2002). According to Minkov & Hofstede (2014) and Huang (2008), uncertainty tolerance is a concept related to the cultural characteristics of the individual. Individuals with uncertainty intolerance are under threat from the unknown, whereas individuals with a high tolerance for uncertainty do not avoid risks. When the relevant literature is reviewed, it is seen that the number of empirical studies conducted in educational institutions on uncertainty intolerance and uncertainty management is few. It was determined that the studies could not provide the big picture of uncertainty management, even the effect sizes of the studies were not calculated in any of the studies, and a statistical conclusion could not be reached on whether the teachers' intolerance of uncertainty and uncertainty management perceptions worked in practice. Therefore, the need to synthesize the results of intolerance of uncertainty and the effectiveness of uncertainty management research emerged. According to Egger, Higgins & Smith (2022) and Rothstein, Sutton & White (2021), research syntheses are important in terms of the decision-making process about the studies. It will not be enough for people to decide with the results of the primary studies. From this point of view, it was aimed to scrutinize the effectiveness of uncertainty intolerance and uncertainty management researches with meta-analysis method. For this purpose, the following hypotheses were formed for meta-analytical analyzes.

$H_1$=The effect size of research into intolerance of uncertainty and uncertainty management is positive.

$H_2$=Publication type variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies.

$H_3$=Title variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies.

## METHOD

### Model and Paradigm of the Research

With this research, it was aimed to scrutinize the effect size of uncertainty intolerance and uncertainty management researches by using meta-analysis method. Meta-analysis is a statistical method that systematically reviews studies to estimate effect sizes in the population, evaluates the results of primary studies with a quantitative approach, and combines studies on the same subject to make a general judgment (Egger, Higgins & Smith, 2022; Harrer et al. , 2022). In this research, meta-analysis studies were carried out in the axis of realism philosophy and functional paradigm. The functional paradigm is a paradigm approach that argues that the social world is relatively undeniable, and that considers and evaluates the facts objectively (Gunbayi & Sorm, 2020).

### Types of Meta-Analysis and Effect Size

Meta-analysis is divided into two groups as correlational and group comparison meta-analyses based on effect size calculations (Cleophas & Zwinderman, 2017; Stangl & Berry, 2000). This research was carried out as a type of group comparison meta-analysis, which is one of the types of meta-analysis. Effect size is the value that reflects the size of the relationship between two variables or the effect of the application in the meta-analysis study. In other words, it is the value that gives information about how much the independent variable affects the dependent variable positively or negatively (Littell, Corcoran & Pillai, 2008). The overall effect is one of the purposes of synthesizing studies and is the weighted average of study effects. The shape shown as a diamond in meta-analysis studies reflects the magnitude of the predicted sensitivity and also represents the effect size (Simske, 2019; Zoccai, 2018). In meta-analysis, effect sizes are calculated with mean differences, correlation coefficient and probability ratio (Borenstein

et al.,2019; Hangji, 2017). Since bivariate groups were considered in this study, the difference of means was used to calculate the effect size.

### Model Selection and Identification of Outliers

In the meta-analysis, the overall effect size is calculated according to the fixed and random effects model. In the fixed-effects model, there is an assumption that all studies participating in the research are the same, while in the random-effects model, all studies are different (Card, 2012). In this study, the sample size of the population of the studies included in the research, their standard deviations were different from zero and the measurement tools differed. Therefore, for model selection, it was decided whether the statistical values of Q, $I^2$ and $X^2$ heterogeneity differed at 95% confidence interval and p<.05 significance level (Ellis, 2010). Heterogeneity tests were used to determine the effect sizes of the studies included in the meta-analysis, as well as to determine the moderator variables that would affect the results of the research in the emergence of heterogeneity (Chen & Peace, 2021). The presence of outliers in the meta-analysis causes an excessive increase in the mean, variances and statistics used in other meta-analysis. Outliers are highly likely to be found in datasets of meta-analyses and in individual studies (Khan, 2020). It is extremely difficult to detect errors in primary studies, as initial studies are reported only with outcome statistics and not raw data. Because the data appearing as outliers have no obvious reason (Lipley & Wilson, 2001). Therefore, in this study, the study weights of all studies included in the study were calculated according to fixed and random effects. According to the random effects, it was found that the working weights were proportionally close to each other.

### Publication Bias

In meta-analysis studies, publication bias is a term used for the situation where the studies published in the literature do not systematically represent the population of the completed research (Cleophas & Zwinderman, 2017). Researchers may choose not to publish studies that do not yield statistically significant results. In general, journals are unlikely to accept studies with negative or unexpected results even if they wanted to publish them (Stangl & Berry, 2000). The presence of publication bias in a meta-analysis can skew the results and threaten the validity of the research Hedges & Olkin (1985). In meta-analyses with publication bias, it is entirely possible to overestimate the impact of an intervention and, more importantly, to reverse the direction of impact (Harrer et al., 2022). It can also result in an intervention that is actually harmful, but beneficial. In this study, a funnel plot diagram was drawn to determine the publication bias, and it was tried to determine whether there was a publication bias with Duval and Tweedie's trim and fill method, Egger's regression intercept and Rosenthal and Orwin's protected N method.

### Data Collection and Inclusion Criteria

In the research, it was aimed to reach the empirical studies carried out between 2012-2022 on the effectiveness of uncertainty intolerance and uncertainty management research. In line with this purpose, the criteria for inclusion in the research between 01 June 2022 and 01 September 2022 are that the studies were conducted in Turkey between the years 2012-2022, that the studies contained information that allowed the calculation of meta-analysis, that the sample groups of the studies were pre-service teachers, teachers and education administrators. A rigorous literature review was conducted with the keywords "intolerance of uncertainty, tolerance of uncertainty, uncertainty, uncertainty management, uncertainty from educational institutions" based on the fact that the studies were published in the databases of YÖK National Thesis Center, Dergi Park, Tr Index, Turkish Education Index, Academic Directory. Purposeful sampling method was used in reviewing the studies. Purposeful sampling is a sampling method that allows deep research according to the specific situation of the research and the number of samples (Creswell & Creswell, 2018). As a result of the search, 41 studies were found, but it was decided to include 6 theses and 2 articles that met the inclusion criteria of the studies in the meta-analysis. The total sample number of these included studies was determined as N=2704.

### Coding Process

The studies included in the meta-analysis were coded in line with the main purpose of the research and in accordance with the inclusion criteria of the research. Sample sizes, arithmetic mean and standard deviation values, title and publication type included in the studies were written in a coding form. In order to avoid mistakes in the coding process, the coding was repeated by two academicians who were experts in the field of meta-analysis, and kappa reliability analysis was performed between the coders. As a result of the calculation, the inter-coder reliability coefficient [K=.849, t=5.576, p=<.05] was found. According to Landis and Koach (1977), this value showed that the inter-coder reliability value was significantly high.

### Data Analysis

In this study, since the scores of the studies included in the meta-analysis were obtained from different scales, the effect sizes of the studies were calculated by using Hedges's g coefficient and standardizing the effect sizes. Confidence level of 95% significance level p<.05 was taken as basis in data analysis. Effect sizes <.20 weak effect; <.50 small effect >.51 medium effect and >1 large effect interpreted based on reference intervals (Cooper, Hedges & Valentine, 2019). Considering that the population sizes of the individual studies examined within the scope of the meta-analysis were different and did not represent the same population, it was decided before the analysis to calculate the overall effect size according to the random effects model. On the other hand, the effect sizes related to whether there were outliers between the effect size values of the individual studies were examined with the study weights and given in Figure 3 with the funnel plot diagram. In addition, whether there was heterogeneity in the results

of the studies included in the meta-analysis was determined by calculating with the heterogeneity test. Trim and fill, protected N numbers, regression intercept values were calculated to determine the publication bias. CMA (Comprehensive Meta-Analysis $V_3$) package program was used in data analysis.

## FINDINGS

### Findings on Publication Bias

In the meta-analysis study of uncertainty intolerance and uncertainty management research, a funnel plot diagram was drawn to test the reliability and validity of publication bias, and Rosenthal and Orwin's protected N, Duval and Tweedie's trim and fill and Egger's regression intercept were used to reach a statistical general conclusion. The funnel plot diagram of the standard error and effect size values of the studies included in the meta-analysis is given in Figure 3.

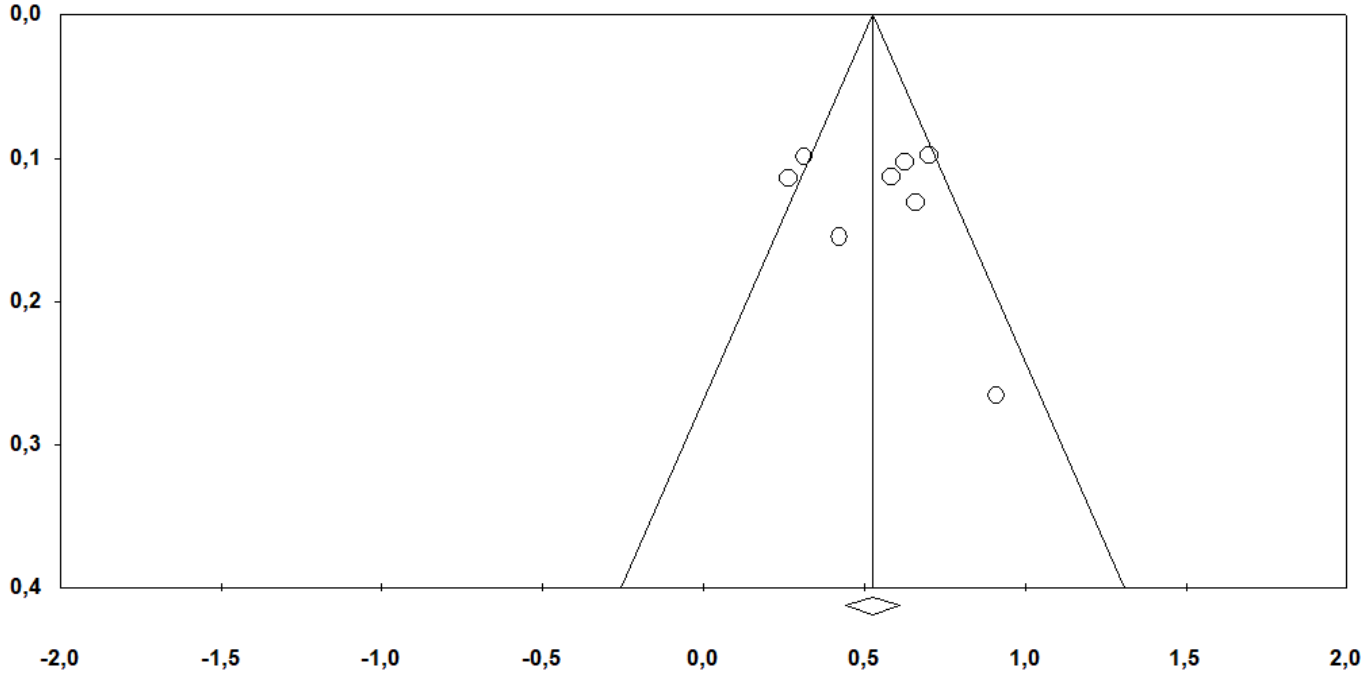


**Figure 3. Funnel plot diagram of the effect sizes and standard errors of the studies included in the meta-analysis**

The most commonly used method in revealing publication biases in meta-analysis studies, in terms of creating a first impression for the researcher, is drawing the funnel plot diagram (Cumming, 2012). However, although funnel plot diagrams are useful in theory, the assessment of publication bias in the graph is purely subjective and in most reviews there are not enough studies to make a visual assessment (Hartung, Knapp & Sinha, 2008). On the X-axis of the graph in Figure 3, there were Hedges's g effect sizes of the included studies on the effectiveness of uncertainty intolerance and uncertainty management research, and on the Y-axis standard errors of the studies included in the meta-analysis. The studies at the peak of this graph were studies with a large sample in terms of sample number. In case of publication bias in the funnel plot diagram, the points in the diagram turn into an asymmetrical funnel shape (Leandro, 2005; Patole, 2021; Sterne, 2009). This indicates that there are missing studies in the studies included in the meta-analysis (Dias et al., 2018). When the funnel plot diagram for this research was examined, it could be indicated that the distributions of the studies included in the meta-analysis showed a symmetrical distribution and this distribution did not create publication bias. After examining the funnel plot diagram, statistical analyzes on publication bias were made in order to reach a final decision. Analysis results of Rosenthal's fail-safe N method are given in Table 1, Orwin's fail-safe N method analysis results are given in Table 2, Duval and Tweedie's trim and fill method analysis results are given in Table 3 and Egger's regression intercept is given in Table 4.

**Table 1. Rosenthal's Fail-Safe N Analysis Results**

| Gözlemlenen Çalışmalar için | | Alfa | Z for Alfa | Tails | Observed number of research | Number of research (p>.05) |
|---|---|---|---|---|---|---|
| Z Value | p Value | | | | | |
| 12.40887 | .000*** | .0500 | 1.959 | 2.000 | 8 | 313 |

* p < .05; ** p < .01; *** p< .001

When the results of Rosenthal's fail-safe N method analysis on the effectiveness of uncertainty intolerance and uncertainty management researches on publication bias were examined in Table 1, it was found that at least 313 studies were required for this research in a zero or negative direction. In Rosenthal's fail-safe N method, the p values for each study were converted to the z value and the z value was found to be 1.959. The fact that this value is >1 indicates that the results of the meta-analysis were also resistant for future studies and that there was no publication bias in the study (Rosenthal, 1987).

**Table 2. Orwin's Fail-safe N Analysis Results**

| | |
|---|---|
| Average effect size of observed studies | .525 |
| The level at which the effect size will be reduced | .00001 |
| Mean effect size of missing studies | .000 |
| Number of studies required for non-significant effect size | 613 |

* p < .05; ** p < .01; *** p< .001

Orwin's fail-safe N method calculates the number of new studies that should be added to the meta-analysis study in order to zero the effect obtained in the meta-analysis studies (Schmid, Stijnen & White, 2021). In Rosentahal's approach, the studies are evaluated only according to their p-values, while the observed effect size is taken into account in the Orwin approach. For this study, the effect size value of .525 was taken into account. When the results calculated by Orwin's fail-safe N method analysis were examined in Table 2, 613 studies with effect sizes were needed to change the results of the current meta-analysis study, which consisted of eight studies, from positive to negative. Accordingly, it could be said that the current meta-analysis study conducted with eight individual studies was quite reliable and did not have publication bias.

**Table 3. Trim and Fill Analysis Results by Duval and Tweedie**

| | |
|---|---|
| Observed effect size value | .533 |
| Adjusted effect size value | .513 |
| Number of trimmed studies | 0 |

* p < .05; ** p < .01; *** p< .001

When Duval and Tweedie's trim and fill method analysis results were examined in Table 3, the observed effect size value was .533 and the adjusted effect size value was .513. Both the observed effect size value and the adjusted effect size values were close to each other. Therefore, in this meta-analysis research, there was no need to trim any studies that may create publication bias. This finding was an indication that the overall effect size calculated in this study was reliable and there was no publication bias.

**Table 4. Egger's Regression Intercept Analysis Results**

| **Intercept** | SE | df | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| 1.459 | 2.429 | 6 | .600 | .569 | -4.484 | 7.403 |

* p < .05; ** p < .01; *** p< .001 LLCI= Lower Confidence Interval; ULCI= Upper Confidence Interval

When the analyzes of Egger's regression intercept were examined in Table 4, the intercept value was calculated as 1.459 standard error 2.429. The fixed value is in the lower and upper bound confidence intervals. On the other hand, the calculated t value was .600 and the significance value was .569 [$t_{(6)}$=.600, p>0.05]. Since this calculated value satisfies the p>.05 condition, it showed that there was no publication bias in this meta-analysis study.

## Findings on Heterogeneity and Effect Size

After it was understood that the effectiveness of uncertainty intolerance and uncertainty management researches was not affected by publication bias in the calculations related to publication bias and the funnel plot diagram drawn, the calculation of the heterogeneity test was started. Heterogeneity is an assumption of the random effects model, as the presence of heterogeneity among the effect sizes of primary studies indicates the presence of moderator variables, and testing heterogeneity is one of the main goals of meta-analysis (Kulinskaya, Morgenthaler & Staudte, 2008). In meta-analyses, the Q statistic is used to determine the presence of heterogeneity, and the $I^2$ statistic is used to determine the amount of heterogeneity. For model selection, it was calculated whether the statistical values of Q, $I^2$ and $X^2$ heterogeneity differed at 95% confidence interval and p<.05 significance level. The results of the analysis are given in Table 5.

**Table 5. Analysis Results Regarding Heterogeneity of Effect Sizes of Studies Included in Meta-Analysis**

| Type of Model | ES | df | Q | $X^2$ | SE | $I^2$ | LLCI | ULCI |
|---|---|---|---|---|---|---|---|---|
| Random Effects Model | .534 | 7 | 17.842 | 14.07 | .069 | 60.768 | .398 | .670 |

* p < .05; ** p < .01; *** p< .001 LLCI= Lower Confidence Interval; ULCI= Upper Confidence Interval

When the analysis results regarding the heterogeneity of the effect sizes of the studies included in the meta-analysis were examined in Table 5, the heterogeneity value of the studies included in the meta-analysis was found to be Q=17.842. This value exceeded the critical value in the chi-square ($X^2$) table according to a certain degree of freedom and significance level. In addition, the calculated significance value was found to be p=.013. These findings could be considered as a sign that the effect sizes of the studies included in the meta-analysis showed a heterogeneous distribution. On the other hand, the calculated $I^2$ value showed that the variance between studies was not due to chance and was due to heterogeneity (Cooper, 2017). According to the calculated $I^2$ reference intervals, $I^2$<.25 indicates “small heterogeneity”, $I^2$<.50 “moderate heterogeneity” and $I^2$>.75 “high heterogeneity” (Borenstein et al.,2019; Hangji, 2017). The fact that the $I^2$ value calculated in the meta-analysis study was 60.768%

indicates a high level of heterogeneity for this meta-analysis study. The funnel graph (funnel) regarding the effect size values and weights of the studies is given in Figure 4.

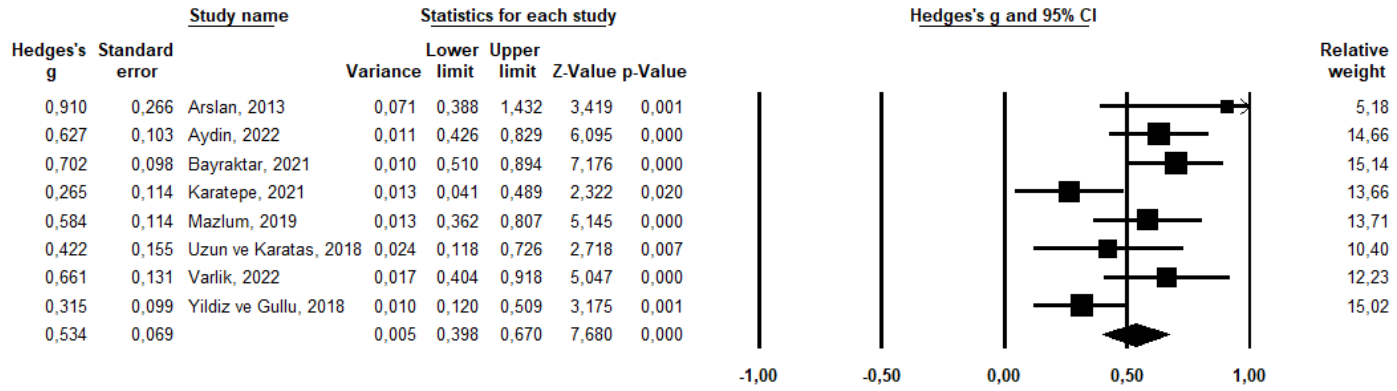


**Figure 4. Funnel plot diagram of the effect sizes and weights of the studies included in the meta-analysis**

When the analysis results regarding the average effect size in general were examined in Table 5, and the funnel plot diagram regarding the effect sizes and weights of the studies included in the meta-analysis in Figure 3; the effect sizes and weights of the studies were given in the 95% confidence interval in the funnel plot diagram regarding the effect sizes and weights of the studies included in the meta-analysis. Accordingly, it was seen that the study that contributed the most to the research contributed 15.14%, while the study that contributed the least contributed 5.18%. In this research, the funnel plot diagram was presented at ±1 range reference. When the line lengths are taken into account, none of the studies included zero values, and the narrow range of the lines means that the decisions are more reliable (Cheung, 2015; Hunter & Schimdt, 2004). When the working weights were examined in the last column, it was found that the distribution was homogeneously close to each other. The smallest effect size value in the studies was calculated as .265 and the largest effect size value was calculated as .910. All effect size values were included in the confidence interval and the significance values were found below 0.05. The diamond shape at the bottom of the funnel plot diagram showed the overall effect sizes of all studies (Riley, Tierney & Stewart, 2021). The mean effect size value at the bottom in the diamond form was calculated as .534 and this value did not include zero. This value showed that the studies had positive and moderate average effect sizes. When these findings were taken together, the effect size level for uncertainty intolerance and uncertainty management research was positive. This finding stated that *"$H_1$=The effect size of intolerance of uncertainty and uncertainty management studies is positive."* showed that the hypothesis was supported. In addition, the high level of heterogeneity indicated the presence of moderator variables that might be present in the meta-analysis study. In the current meta-analysis, title and publication type variables were predicted as moderators and calculations were made accordingly.

## Findings on Heterogeneity and Effect Size

Table 6 shows the moderator analysis results on whether title and publication type variables played a moderator role in the effect size of uncertainty intolerance and uncertainty management research.

**Table 6. Moderator Analysis Results**

| Değişken | $Q_b$ | df | p | $X^2$ | N | ES | LLCI | ULCI |
|---|---|---|---|---|---|---|---|---|
| Publication Type | 4.761 | 1 | .029* | 3.84 | | | | |
| Article | | | | | 2 | .346 | .182 | .509 |
| Thesis | | | | | 6 | .592 | .443 | .741 |
| Title | .778 | 1 | .378 | 3.84 | | | | |
| Teacher | | | | | 6 | .507 | .328 | .685 |
| Education Manager | | | | | 2 | .617 | .449 | .785 |

* p < .05; ** p < .01; *** p< .001 LLCI= Lower Confidence Interval; ULCI= Upper Confidence Interval

The homogeneity value between the groups created according to the publication type variable of the studies included in the meta-analysis was found to be $Q_b$=4.761. From the $X^2$ table, the critical value for 1 degree of freedom at 95% significance level corresponds to 3.84. Since the critical value was smaller than the homogeneity value, the difference between the groups formed according to the publication type variable was statistically significant (p=.029). Therefore, the variable of publication type played a moderator role in the effect size of uncertainty intolerance and uncertainty management research (Chen & Peace, 2021). This finding stated that *"$H_2$=Publication type variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies."* hypothesis was supported. The mean effect size of the articles included in the meta-analysis was .346 between .182 and 0.509 confidence intervals; The average effect size of the theses included in the meta-analysis was calculated as .592 between .443 and .741 confidence intervals. The effect size of the articles included in the meta-analysis for this research was "small", while the effect size of the theses was "medium". This finding showed that there was a significant increase in the mean effect size in favor of the theses.

The homogeneity value between the groups created according to the title variable of the studies included in the meta-analysis was found to be $Q_b$=.778. From the $X^2$ table, the critical value for 1 degree of freedom at 95% significance level corresponds to 3.84. Since the critical value was greater than the homogeneity value, the difference between the groups formed according to the title variable was not statistically significant (p=.378). Therefore, the title variable did not play a moderator role in the effect size of uncertainty intolerance and uncertainty management research. This finding stated that *"$H_3$=Title variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies."* hypothesis was not supported. In the title variable included in the meta-analysis, the average effect size of the teachers was .507 in the confidence interval between .328 and .685; In the title variable included in the meta-analysis, the average effect size of the education administrators was calculated as .617 in the confidence interval of .449 and .785. In the title variable included in the meta-analysis for this study, the effect size was "medium", while the effect size of the education administrators was "moderate". This finding showed that there was a significant increase in the mean effect size in favor of both teachers and education administrators.

## DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In this research, which aimed to investigate the effect size of uncertainty intolerance and uncertainty management researches with meta-analysis method, results related to publication bias, heterogeneity and effect size, and moderator analysis were given in detail. In the meta-analysis study of uncertainty intolerance and uncertainty management research, a funnel plot diagram was drawn to test the reliability and validity of publication bias, and Rosenthal and Orwin's protected N, Duval and Tweedie's trim and fill and Egger's regression intercept calculations were used to reach a statistical general conclusion. When the funnel plot diagram for this study was examined, it was determined that the distributions of the studies included in the meta-analysis showed a symmetrical distribution and this distribution did not create publication bias (Dias et al., 2018; Egger, Higgins & Smith, 2022; Schmid, Stijnen & White, 2021). On the other hand, in Rosenthal's fail-safe N method, the p values for each study were converted to the z value and the z value was found. The fact that the z value found was greater than one showed that the results of the meta-analysis were also resistant for future studies and that there was no publication bias in the study (Harrer et al., 2022). The current meta-analysis study conducted with eight primary studies with Orwin's fail-safe N method analysis was found to be highly reliable and without publication bias (Rothstein, Sutton & White, 2021). When the results of Duval and Tweedie's trim and fill method analysis were examined, it was found that both observed effect sizes and adjusted effect sizes were close to each other. When the analyzes of Egger's regression intercept were examined, the significance value was found to be higher than the p<.05 value, therefore, since this calculated value met the p>.05 condition, it was determined that the studies included in the meta-analysis did not show publication bias (Borenstein et al.,2019). In general, it was concluded that the studies included in the meta-analysis for this study were valid, reliable and did not have publication bias.

The statistical values of Q, $I^2$ and $X^2$ related to the heterogeneity and effect size calculations in the effectiveness of uncertainty intolerance and uncertainty management studies were calculated at the ninety-five percent confidence interval and at the five percent significance level. Accordingly, it was determined that $I^2$ and Q values formed a high level of heterogeneity and exceeded the critical value in the chi-square ($X^2$) table according to a certain degree of freedom and significance level (Rothstein, Sutton & White, 2021). Therefore, this meta-analysis study was conducted with a random effects model. In the drawn funnel plot diagram, it was determined that all studies were significant at the ninety-five percent confidence level and the distribution ratios of the studies were close to each other according to the random effects model (Schmid, Stijnen & White, 2021). Accordingly, it was seen that the study that contributed the most to the research contributed fifteen percent, and the study that contributed the least contributed five percent. In this research, the funnel plot diagram is presented at ±1 range reference. Considering the line lengths, it was determined that none of the studies included zero value and the lines were in narrow range, thus meaning that the decisions were more reliable (Cooper, Hedges & Valentine, 2019). On the other hand, the effect size of the studies on uncertainty intolerance and uncertainty management in educational institutions was positive and moderate. In other words, these studies had a medium level of effectiveness for stakeholders in educational institutions. When these findings were taken together, the effect size level of uncertainty intolerance and uncertainty management research was positive. It was concluded that the hypothesis was supported.

As a result of the analyzes made on whether the publication types included in the meta-analysis and the title variable played a moderator role in the effectiveness of uncertainty intolerance and uncertainty management research; It was determined that the variable of publication type played a moderator role in the effect size of uncertainty intolerance and uncertainty management researches (Simske, 2019). Therefore, *"$H_2$=Publication type variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies."* hypothesis was supported. The articles included in the meta-analysis had the average effect size in the confidence interval; It was determined that the theses included in the meta-analysis had an average effect size in the confidence interval. The effect size of the articles included in the meta-analysis for this research was "small", while the effect size of the theses was "medium". In the studies on uncertainty intolerance and uncertainty management in educational institutions, it was concluded that the average effect size of theses is higher. On the other hand, in the moderator analysis, it was determined that the title variable did not play a moderator role in the effect size of uncertainty intolerance and uncertainty management research. For this reason, *"$H_3$=Title variable plays a moderator role in the effect size of uncertainty intolerance and uncertainty management studies."* hypothesis was rejected. However, in the studies on uncertainty intolerance

and uncertainty management in educational institutions, it was concluded that although the average effect size of teachers was at a medium level, it was lower than the average effect size of educational administrators.

According to Suls & Mullen (1981), uncontrollable factors under uncertainty affect employees and managers. This study showed that education administrators made the right plans based on the motivation tool when there was uncertainty in education when there was uncertainty in education, and they understood that they took on a different task and responsibility. In change processes, managers need to allocate time and resources to deal with uncertainty, because it is an undeniable fact that organizational change is a part of life (Bordia et al., 2004). Therefore, the consequences of not managing organizational change well will be severe (Allen, Jimmieson, Bordia & Irmer, 2007; DiFonzo & Bordia, 1998; Nelson, Cooper & Jackson, 1995). Education administrators try to reflect the changes that can be experienced in education to the school compared to teachers. In addition to learning change and innovations quickly, they also conduct research to learn about development and changes. However, when considered in terms of organization, the communication process is more complex. Individual characteristics, prejudices and abilities of people complicate communication processes. The issues of whether the organization can be successful are related to communication, so communication skills have a special importance for organizational managers. Managers use communication to increase organizational effectiveness, and thanks to communication, employees are taught what is expected of them and how they should do their jobs (Hunt, Tourish & Hargie, 2000). When employees in organizations cannot get information from managers, they turn to other sources of information and therefore uncertainties arise. Compared to teachers, education administrators tried to obtain multidimensional information about complex events and situations in manager-employee relationship and communication. In addition, this finding showed that education administrators cooperated with all stakeholders in the school to eliminate hesitations about any issue, and when there was uncertainty about a subject, they tried to comfort the stakeholders based on the existing experience and knowledge. Individuals' reaction to uncertainty and the degree of emotion also determined the level of tolerance. Each individual's degree of acceptance, acceptance and rejection of uncertainty differs from each other (Clampitt & Williams, 2000). Individuals who cannot tolerate uncertainty will also find they cannot accept that most aspects of life are uncertain, such individuals will experience extreme anxiety, fear, and anxiety under uncertainty and will not be able to manage uncertainty effectively (Buhr & Dugas, 2002).

As a result of the analysis results on the effectiveness of uncertainty intolerance and uncertainty management research in educational institutions, the following suggestions were developed for teachers, education administrators, stakeholders, decision makers, research and researchers.

Research Recommendations

1. Uncertainty is inherent in nature, so uncertainty must be tolerated and managed.

2. Tolerance to ambiguity is a robust construct that has been conceptualized and measured in various ways, so in-service training should be given to teachers through experts on ambiguity tolerance.

3. In the study, the intolerance of uncertainty and uncertainty management effect size value of education administrators was higher than that of teachers. People had different levels of tolerance for uncertainty management. From this point of view, education administrators need to bring teachers together through communication and respect differences.

Recommendations for Researchers

1. With this research, a meta-analysis study was conducted to determine whether the researches on uncertainty intolerance and uncertainty management effectiveness in educational institutions work in practice. A meta-synthesis study can be planned by interpreting the qualitative research on this subject.

2. In educational institutions, teacher behavior under uncertainty and decision-making in uncertainty situations can be carried out with quantitative or mixed method researches so that they can be the subject of meta-analysis in the future, and lay the groundwork for meta-analysis and meta-synthesis researchers in the future.

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## Statements of publication ethics

I hereby declare that the study has no unethical issues and that research and publication ethics have been carried out carefully.

## Ethics Committee Approval Information

Ethics committee permission is not required as this research is a meta-analysis study.

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|Research Article/ Araştırma Makalesi|

# Examining the Information Packages of "Teaching Principles and Methods" and "Intructional Technologies" in the Context of Accreditation

# Akreditasyon Bağlamında "Öğretim İlke ve Yöntemleri" ile "Öğretim Teknolojileri" Ders Bilgi Paketlerinin İncelenmesi

**Funda Uysal**[1]

**Keywords**

1. Accreditation
2. Course Information Package
3. Curriculum and Instruction
4. Professional Instructional (Pedagogical) Knowledge

**Anahtar Kelimeler**

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## Abstract

*Purpose:* This study aims to examine the information packages of compulsory professional pedagogical courses in elementary mathematics programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, according to accreditation.

*Methodology:* Content analysis was performed within the study designed in line with the document analysis method. Frequency was used in analysis of the data collected through the packages of "Teaching Principles and Methods" and "Instructional Technologies" courses in 89 programs for training elementary education mathematics teachers. The study also includes categories and citations for reasons for incompatibility with accreditation.

*Findings:* It is concluded that approximately two-thirds of packages are incompatible. Almost all packages include the necessary parts. The activities and measurement&evaluation methods in private universities or accredited programs precede in terms of compatibility with accreditation. In general, the order of the elements from the most to the least compatible with the accreditation program are; activities, learning outcomes, course objective, and measurement&evaluation methods.

*Highlights:* It is noted that course packages are still not viewable. In terms of being compatible for certification, while certified programs are likely to have advantages over others, it is also probable that they may face comparable challenges.

## Öz

*Çalışmanın amacı:* Bu araştırmanın amacı Eğitim Fakültesi ilköğretim matematik öğretim programlarında, eğitim bilimleri içerisinde sadece eğitim programları ve öğretim alanının sorumlu olduğu zorunlu öğretmenlik meslek bilgisi dersleri olan "Öğretim İlke ve Yöntemleri" ile "Öğretim Teknolojileri" derslerinin bilgi paketlerinin akreditasyon bağlamında incelenmesidir.

*Materyal ve Yöntem:* Araştırma belge tarama modelinde desenlenmiştir. İçerik çözümlemesi gerçekleştirilmiştir. 89 ilköğretim matematik öğretmen yetiştirme programında yer alan "Öğretim İlke ve Yöntemleri" ile "Öğretim Teknolojileri" ders bilgi paketleri aracılığıyla toplanan verilerin analizinde frekanstan yararlanılmış, akreditasyona uygun olmama nedenleri için kategorilere ve alıntılara da yer verilmiştir.

*Bulgular:* Bilgi paketlerinin yaklaşık üçte ikisinin olmadığı anlaşılmaktadır. Gerekli kısımlara bilgi paketlerinin tamamına yakınında rastlanmıştır. Vakıf üniversitelerinde ya da akredite olan programlarda özellikle etkinliklerin ve ölçme-değerlendirme araçları akreditasyona uygunluk bağlamında daha öndedir. Genel olarak, daha fazla uygun olmadan daha az uygun olmaya doğru, sırasıyla etkinlikler, öğrenme çıktıları, dersin amacı ve ölçme-değerlendirme araçlarının program akreditasyonuna uygunluğu söz konusudur.

*Önemli Vurgular:* Akreditasyona uygun olma bağlamında akredite olan programların, diğerlerine göre daha iyi oldukları kısımların var olmasının beklenen ve gerçekleşen bir durum olmasıyla birlikte, benzer sıkıntıyı yaşıyor olması da söz konusudur.

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## INTRODUCTION

Due to its impact on economic and social growth, the creation and preservation of cultural identity, and the strengthening of peace (UNESCO, 2015: As cited in Mızıkacı, et al., 2019), higher education requires a review of education, research, and community service duties (Mızıkacı et al., 2019). Maintaining quality creates standards, evaluators and a focus on decisions to be made in the context of higher education as well (Brittingham et al., 1999). These concepts lead us to accreditation.

Ensuring and validating the quality assurance (Hamalainen & Jakku-Sihvonen, 2000), which emerges as an effort to improve and maintain the quality of education in the Bologna process and in the initiative to establish a European Higher Education Area, requires referring to accreditation (Staub, 2019). Accreditation involves an evaluation in which the functioning of a profession, discipline, institution or program is formally assessed considering certain standards (Adelman, 1992: As cited in Schwarz & Westerheijden, 2007; Altschuld & Engle, 2015; De Corte, 2014). The accreditation process includes an official review of whether or not an education program meets certain standards (Altschuld & Engle, 2015). In this context, accreditation refers to a process consisting of self-evaluation, followed by peer-review and site visit reports (Van Kemenade & Hardjono 2010), and finally obtaining an official certificate indicating that accreditation has been granted upon a positive decision (McDavid & Huse, 2015). Accreditation in higher education involves activities carried out for the purpose of increasing the quality of and continuously improving education services based on certain standards (Brittingham et al., 1999).

Accreditation can take place at the institutional level or as specific to a program (Haakstad, 2001: As cited in Harvey and Williams, 2010; Schwarz and Westerheijden, 2007). Van Vught and Westerheijden (1994) suggest that although different systems have their own unique features, they can have aspects that may be commonized. The literature (Brittingham et al., 1999; Eaton, 2015; Van Vught & Westerheijden, 1994) shows that there are stages that may be commonized (Uysal, 2022). In this context, the aforementioned stages are as follows; the involvement of the accreditation agency in the process, setting standards, performing self-evaluation, peer review, site visit, reporting and responding, decision-making by the accreditation agency and periodic external review (Uysal, 2022).

The Turkish Higher Education Quality Council (THEQC) engages in the authorization and recognition processes of national and international accreditation agencies (THEQC, 2020). One of the accreditation agencies authorized by THEQC is the Association for Evaluation and Accreditation of Teacher Education Programs (EPDAD), which is responsible for the accreditation of Faculties of Education (Turkish Higher Education Quality Council (THEQC), 2022). Programs accredited by EPDAD are published on the website (Association for Evaluation and Accreditation of Teacher Education Programs (EPDAD), 2022). While the evaluators assigned to the accreditation process of the relevant programs generally conduct a field visit; taking into account the EPDAD Guideline for Teacher Education Standards (EPDAD, 2021a), they also answer questions about various documents (EPDAD, 2021b). The publicly available documents among these are the course information packages. Evaluators focus on the objectives, learning outcomes, resources, activities and measurement&evaluation methods of the courses in the course information packages (EPDAD, 2021b).

While the number of programs accredited by EPDAD in the Faculties of Education was three in 2018 (Kavak, Uysal & Kısa, 2019), the number has started to increase since this year. However, the monitoring reports suggest that among the aspects of program accreditation that are open to improvement is raising awareness on accreditation in the relevant field. The implementation of monitoring practices for accredited programs is another important requirement (THEQC, 2020).

Considering all of the abovementioned issues, it is deemed important to identify to what extent the non-accredited programs are ready for accreditation and to monitor the accredited programs. Limiting the scope, this study focuses on the review of course information packages by the EPDAD evaluators based on the guideline for teacher education standards. The study firstly focuses on the examination of the professional instructional (pedagogical) knowledge courses, and then within these courses, only on the ones that are related to the field of curriculum and instruction within educational sciences, which are also among the fields of expertise of the researcher. Since the study also wishes to perform a review for the accredited and non-accredited programs, a specific focus is engaged on the field of elementary education mathematics in order to follow a single program. This study aims to examine the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, in the context of the accreditation process. In this context, the study seeks to find answers to the following research questions:

(1) What is the situation regarding the availability of information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences?

(2) Concerning the following elements of the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences:

(a) how compatible are the course objectives with the program accreditation?

(b) how compatible are the learning outcomes with the program accreditation?

(c) how compatible are the resources with the program accreditation?

(d) how compatible are the activities with the program accreditation?

(e) how compatible are the measurement&evaluation methods with the program accreditation?

## METHOD/MATERIALS

The study was designed with the document analysis method. In document analysis, data is collected by examining of available documents. Content analysis, which is one of its types, is carried out for the purposes of identifying certain features of a certain document through quantification. The researcher tries to present certain points of view in a document through analyzes in line with certain criteria (Karasar, 2014: 183-184). In this study, quantitative breakdowns are provided in order to evaluate the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences in terms of course objectives, learning outcomes, resources, activities and measurement&evaluation within the scope of accreditation, based on which evaluations were made. In this context, the study is qualified as content analysis.

Current data suggest that there are a total of 204 universities, 129 of which are public and 75 of which are private universities. In these universities, there are 94 faculties of education, 78 of which are in public universities and the other 16 are in private universities (Council of Higher Education (CoHE), 2022). In these faculties of education, there are a total of 89 programs for training elementary education mathematics teachers, 76 of which are in public universities and 13 of which are in private universities. Table 1 indicates the number of elementary education mathematics teacher training programs according to their accreditation status.

**Table 1. Number of elementary education mathematics teacher training programs**

| | Accredited | | Nonaccredited | |
|---|---|---|---|---|
| | Public | Private | Public | Private |
| Elementary education mathematics teacher training programs | 13 | 5 | 63 | 8 |
| Total | 18 | | 71 | |

As indicated in Table 1, there are 18 accredited programs, 13 of which are in public and the other 5 are in private universities (EPDAD, 2022). However, there are a total of 71 nonaccredited programs, 63 of which are in public and 8 are in private universities (The Measuring Selection and Placement Center, 2022). Within the scope of the purpose of the study, the web pages of the universities were analyzed for these programs. Program information packages were accessed via the main menu of the university, directly via the interface for the Bologna process or via the interface of the relevant program. In the program information packages and among the professional instructional (pedagogical) knowledge courses, specific focus was given to "Teaching Principles and Methods" and "Instructional Technologies" for which instructors from only the Division of Curriculum and Instruction will be assigned within the department of Educational Sciences. Courses in which instructors from at least two divisions can be assigned, including the Division of Curriculum and Instruction, were not included in the study. For each course, sub-sections that may or may not include course objectives, learning outcomes, resources, activities, and measurement&evaluation methods have been accessed, respectively. Data were transferred to an Excel document from the web pages. Analysis and transfer to the Excel document of the web pages took approximately 5 to 15 minutes for each course.

As shown in Table 2, the course information packages were scanned to answer the research questions. Relevant frequency distributions are provided here in below.

**Table 2. Collection and analysis of data**

| Research question | | Collection of data | Analysis of data |
|---|---|---|---|
| 1. What is the situation regarding the availability of information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences? | | - Teaching Principles and Methods & Instructional Technologies course information packages | |
| 2. Concerning the elements of the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of | 2.1. How compatible are the course objectives with the program accreditation? | - Course objectives in Teaching Principles and Methods & Instructional Technologies course information packages | Frequency |
| | 2.2. How compatible are the learning outcomes with the program accreditation? | - Learning outcomes in Teaching Principles and Methods & Instructional Technologies course information packages | |

| | | |
|---|---|---|
| the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences; | 2.3. How compatible are the resources with the program accreditation? | - Resources in Teaching Principles and Methods & Instructional Technologies course information packages |
| | 2.4. How compatible are the activities with the program accreditation? | - Student workload tables in Teaching Principles and Methods & Instructional Technologies course information packages |
| | 2.5. How compatible are the measurement&evaluation methods with the program accreditation? | - Evaluation system tables in Teaching Principles and Methods & Instructional Technologies course information packages |

In the context of accessible course information packages; in the accreditation process of the programs, within the scope of the questions to which the evaluators assigned by the EPDAD will seek answers, the sub-sections of “course curriculum, lesson plans, exams” of the documents’ title focus on the course objective, learning outcomes, resources, activities and measurement&evaluation methods (EPDAD, 2021b). In this context, as seen in Table 2 in this study:

- Availability of course information packages was examined (EPDAD, 2021a, 2021b).
- In the context of the course objectives' compatibility with program accreditation, whether the objectives are clearly stated and compatible (EPDAD, 2021a, 2021b) was examined. In the context of their compatibility, whether these were carried out by the instructor and whether these were provided from their point of view (COHE, 2010) were taken into account. Categories and citations for reasons for incompatibility with accreditation were included.
- In the context of compatibility of learning outcomes with program accreditation, whether these are clearly stated in observable and measurable actions, whether these are sufficient in number (EPDAD, 2021a, 2021b) were examined. The number of learning outcomes is expected to be between 5 and 9 (Bingham, 1999). Categories and citations for reasons for incompatibility with accreditation were included.
- In the context of the resources' compatibility with program accreditation, whether these were recommended was examined (EPDAD, 2021a, 2021b).
- In the context of the activities' compatibility with the program accreditation, whether there are activities or projects available that will contribute to the personal development of students (EPDAD, 2021a, 2021b) was examined.
- In the context of the measurement&evaluation methods' compatibility with program accreditation, whether these are compatible with the course objective (EPDAD, 2021a, 2021b) was examined.

Miles & Huberman's (1994) formula was used to determine the agreement between expert opinions for the codings performed. The coding was carried out by two researchers separately. Accordingly, the intercoder reliability percentage was calculated as 0.89, which is deemed as an acceptable value for Miles and Huberman (1994). In the analysis of the data, frequency distributions are provided here in considering both class levels and subject areas, taking into account the coding performed.

## FINDINGS

In this study that examines the information packages of compulsory professional instructional (pedagogical) knowledge courses in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, in the context of the accreditation process, whether there are available Teaching Principles and Methods & Instructional Technologies course information packages was examined. In this context, answer was sought to the research question of “What is the situation regarding the availability of information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences?” The situation regarding the availability of course information packages is presented in Table 3.

**Table 3. Availability of course information packages**

| Courses | Course information package | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Available | | | | Not available | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 10 | 3 | 39 | 3 | 3 | 2 | 24 | 5 |
| Instructional Technologies | 10 | 3 | 39 | 3 | 3 | 2 | 24 | 5 |
| Total | 20 | 6 | 78 | 6 | 6 | 4 | 48 | 10 |
| | 26 | | 84 | | 10 | | 58 | |
| | 110 | | | | 68 | | | |
| | 178 | | | | | | | |

As can be seen in Table 3, it was observed that 110 of 178 information packages were accessible, while the other 68 were not available. In the context of the availability of course information packages:

- Taking into account the accreditation status, it has been concluded that 84 of the 142 information packages for non-accredited programs were observable, while 58 were not. For accredited programs, 26 of the 36 information packages are observable, while it is not possible to observe the other 10.
- Taking into the account whether the university is a public or private university, it is observed that 98 of the 152 information packages are available and 54 of them are not available in public universities. It has been concluded that 12 of the 26 information packages are available at private universities, while the other 14 are not available.

In line with the research question of “How compatible are the course objectives in the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, with the program accreditation?”, firstly the availability of course objectives is presented in Table 4 as concluded from the examination performed.

**Table 4. Availability of course objectives**

| Courses | Course Objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Available | | | | Not Available | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 10 | 1 | 38 | 3 | 0 | 2 | 1 | 0 |
| Instructional Technologies | 10 | 1 | 38 | 2 | 0 | 2 | 1 | 1 |
| Total | 20 | 2 | 76 | 5 | 0 | 4 | 2 | 1 |
| | 22 | | 81 | | 4 | | 3 | |
| | 103 | | | | 7 | | | |
| | 110 | | | | | | | |

As can be seen in Table 4, 103 of the 110 information packages include the course objective, while course objectives are not available in 7 of the information packages. In the context of the availability of the course objective:

- Taking into account the accreditation status, it is observed that 81 of the 84 information packages for non-accredited programs specify an objective, while the other 3 do not include a course objective. For accredited programs, it has been concluded that while 22 of the 26 information packages include an objective, course objective is not available in the other 4.
- Taking into the account whether the university is a public or private university, it is observed that 96 of the 98 information packages in public universities include a course objective, while 2 of the packages do not. It has been concluded that while 7 of the 12 information packages in private universities include an objective, course objective is not available in the other 5.

The situation regarding the compatibility of the course objectives with the program accreditation is presented in Table 5.

**Table 5. Compatibility of course objectives with the program accreditation**

| Courses | Course Objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Compatible | | | | Incompatible | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 3 | 1 | 18 | 1 | 7 | 0 | 20 | 2 |
| Instructional Technologies | 4 | 1 | 21 | 1 | 6 | 0 | 17 | 1 |
| Total | 7 | 2 | 39 | 2 | 13 | 0 | 37 | 3 |
| | 9 | | 41 | | 13 | | 40 | |
| | 50 | | | | 53 | | | |
| | 103 | | | | | | | |

As indicated in Table 5, it is observed that the course objective is compatible in 50 of the 103 information packages, while it is observed that the course objective is not compatible in 53 of the packages. In the context of the compatibility of the course objective:

- Taking into account the accreditation status, it is observed that the objective in 41 of the 81 information packages for non-accredited programs are compatible, while the objective is not compatible in the other 40. For accredited programs, it has been concluded that the objective is compatible in 9 of the 22 information packages while it is not compatible in the other 13 packages.
- Taking into the account whether the university is a public or private university, it is observed that the objective in 46 of the 96 information packages in public universities are compatible, while it is not compatible in the other 50. It has been concluded that 4 of the 7 information packages at private universities include a compatible objective, while the objective in 3 of the packages is not compatible.

Examples of information packages that are suitable for the course purpose are as follows:

*"To gain knowledge, skills and competence related to education, training, curriculum development, teaching models, strategies, methods and techniques."*

*"The aim of the course is to enable prospective teachers to design and develop materials in accordance with design principles, and to evaluate the course materials they have chosen."*

Upon examination for the reasons for incompatibility of the course objectives, it is observed that the objective is written for the student (n=48), there is expressional ambiguity in the objective (n=3) or the objective provides only the content (n=2). The following examples can be provided about the objective being for the student:

*"… Ability to comprehend instructional strategies, methods and techniques…"*

*"…Ability to recognize the concepts related to Instructional Technologies…"*

The following examples can be provided about the objective containing only the content:

*"Properties of various Instructional Technologies, …"*

*"Basic concepts of teaching, principles of learning and teaching, …"*

The following example can be provided about the expressional ambiguity:

*"The objective of this course is to understand the role of Instructional Technologies in the learning process and to gain the b skills of selecting, producing and implementing based on the level of the student."*

In line with the research question of "How compatible are the learning outcomes in the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, with the program accreditation?", firstly the availability of learning outcomes is presented in Table 6 as concluded from the examination performed.

**Table 6. Availability of learning outcomes**

| Courses | Learning Outcomes |
|---|---|

| | Available | | | | Not Available | | | |
|---|---|---|---|---|---|---|---|---|
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 10 | 3 | 38 | 3 | 0 | 0 | 1 | 0 |
| Instructional Technologies | 10 | 3 | 39 | 3 | 0 | 0 | 0 | 0 |
| Total | 20 | 6 | 77 | 6 | 0 | 0 | 1 | 0 |
| | 26 | | 83 | | 0 | | 1 | |
| | 109 | | | | 1 | | | |
| | 110 | | | | | | | |

As can be seen in Table 6, 109 of the 110 information packages include the learning outcomes, while learning outcomes are not available in the last 1 package. In the context of the availability of the learning outcomes:

- Taking into account the accreditation status, it has been concluded that while 83 of the 84 information packages for non-accredited programs include learning outcomes, one of them does not include the learning outcomes. It is observed that learning outcomes are available in all 26 information packages for accredited programs.
- Taking into the account whether the university is a public or private university, it has been concluded that 97 of the 98 information packages in public universities include learning outcomes, while one of them does not include the learning outcomes. It is observed that learning outcomes are included in all of the 12 information packages available in private universities.

The situation regarding the compatibility of the learning outcomes with the program accreditation is presented in Table 7.

**Table 7. Compatibility of learning outcomes with the program accreditation**

| Courses | Learning outcomes | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Compatible | | | | Incompatible | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 5 | 1 | 16 | 2 | 5 | 2 | 22 | 1 |
| Instructional Technologies | 3 | 2 | 20 | 1 | 7 | 1 | 19 | 2 |
| Total | 8 | 3 | 36 | 3 | 12 | 3 | 41 | 3 |
| | 11 | | 39 | | 15 | | 44 | |
| | 50 | | | | 59 | | | |
| | 109 | | | | | | | |

As can be seen in Table 7, it is observed that the learning outcomes are compatible in 50 of the 109 information packages, while it is observed that they are not compatible in 59 of the packages. In the context of the compatibility of the learning outcomes:

- Taking into account the accreditation status, it is observed that the learning outcomes in 39 of the 83 information packages for non-accredited programs are compatible, while the learning outcomes are not compatible in the other 44. For accredited programs, it is observed that the learning outcomes are compatible in 11 of the 26 information packages, while they are not compatible in the other 15 packages.
- Taking into the account whether the university is a public or private university, it has been concluded that the learning outcomes in 44 of the 97 information packages in public universities are compatible, while they are not compatible in the other 53. It is observed that 6 of the 12 information packages at private universities include compatible learning outcomes, while the learning outcomes in 6 of the packages are not compatible.

Examples of information packages with appropriate learning outcomes are as follows:

*"…Explain the basic concepts of teaching principles and methods..."*

*"…Knows information and communication technologies used in education..."*

Upon examination of the information packages which include learning outcomes that are not compatible:

- It has been observed that there are learning outcomes amounting to 3, 4, 10, 11, 12, 14 or 15 (n=24) even though they were expressed in observable and measurable actions.
- It has been observed that there are learning outcomes that are expressed in more than one action (n=21), with content only (n=1) or for pre-school level (n=1), although their number is 5-9, which is compatible.
- The following phrases can be provided as an example; “To comprehend the principles of designing materials for preschool education”, “Instructional strategies” or “To design, develop and evaluate materials in accordance with design principles.”
- It has been observed that there are learning outcomes that fail to meet the requirement for action by having more than one action and fail to meet the requirement for number by being in numbers of 3, 4, 10, 13, 14, 17 or 18 (n=12).

In line with the research question of “How compatible are the resources in the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, with the program accreditation?”, firstly the availability of resources is presented in Table 8 as concluded from the examination performed.

**Table 8. Availability of resources**

| Courses | Resources | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Available | | | | Not available | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 9 | 3 | 36 | 2 | 1 | 0 | 3 | 1 |
| Instructional Technologies | 9 | 2 | 35 | 2 | 1 | 1 | 4 | 1 |
| Total | 18 | 5 | 71 | 4 | 2 | 1 | 7 | 2 |
| | 23 | | 75 | | 3 | | 9 | |
| | 98 | | | | 12 | | | |
| | 110 | | | | | | | |

As can be seen in Table 8, 98 of the 110 information packages include the resources, while resources are not available in 12 information packages. In the context of the availability of the resources:

- Taking into account the accreditation status, it has been concluded that while 75 of the 84 information packages for non-accredited programs include resources, 9 of them do not include available resources. It is observed that resources are available in 23 of 26 information packages for accredited programs, while resources are not available in the other 3.
- Taking into the account whether the university is a public or private university, it has been concluded that 89 of the 98 information packages in public universities include resources, while 9 of them do not include the resources. It is observed that resources are available in 9 of 12 information packages, while they are not available in the other 3 in private universities.

In line with the research question of “How compatible are the activities in the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, with the program accreditation?”, firstly the availability of the activities is presented in Table 9 as concluded from the examination performed.

**Table 9. Availability of activities**

| Courses | Activities | |
|---|---|---|
| | Available | Not available |

| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 9 | 3 | 37 | 3 | 1 | 0 | 2 | 0 |
| Instructional Technologies | 8 | 2 | 38 | 3 | 2 | 1 | 1 | 0 |
| Total | 17 | 5 | 75 | 6 | 3 | 1 | 3 | 0 |
| | 22 | | 81 | | 4 | | 3 | |
| | 103 | | | | 7 | | | |
| | 110 | | | | | | | |

As can be seen in Table 9, 103 of the 110 information packages include activities, while activities are not available in 7 information packages. In the context of the availability of the activities:

- Taking into account the accreditation status, it has been concluded that while 81 of the 84 information packages for non-accredited programs include activities, 3 of them do not include available activities. It is observed that activities are available in 22 of 26 information packages for accredited programs, while activities are not available in the other 4.
- Taking into the account whether the university is a public or private university, it has been concluded that 92 of the 98 information packages in public universities include activities, while 6 of them do not include activities. It is observed that resources are available in 11 of 12 information packages, while they are not available in the other 1 in private universities.

The situation regarding the compatibility of the activities with the program accreditation is presented in Table 10.

**Table 10. Compatibility of activities with the program accreditation**

| Courses | Activities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Compatible | | | | Incompatible | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 7 | 3 | 29 | 2 | 2 | 0 | 8 | 1 |
| Instructional Technologies | 8 | 2 | 29 | 3 | 0 | 0 | 9 | 0 |
| Total | 15 | 5 | 58 | 5 | 2 | 0 | 17 | 1 |
| | 20 | | 63 | | 2 | | 18 | |
| | 83 | | | | 20 | | | |
| | 103 | | | | | | | |

As can be seen in Table 10, it is observed that the activities are compatible in 83 of the 103 information packages, while it is observed that they are not compatible in 20 of the packages. In the context of the compatibility of the activities:

- Taking into account the accreditation status, it is observed that the activities in 63 of the 81 information packages for non-accredited programs are compatible, while they are not compatible in the other 18. For accredited programs, it is observed that the activities are compatible in 20 of the 22 information packages, while they are not compatible in the other 2 packages.
- Taking into the account whether the university is a public or private university, it is observed that the activities in 73 of the 92 information packages in public universities are compatible, while they are not compatible in the other 19. It is observed that 10 of the 11 information packages at private universities include compatible activities, while the activities in 1 of the packages are not compatible.

It is observed that only midterm and final exams are included in the tables related to student workload in the context of the compatibility of the activities. However, for the activities that are compatible, the majority include only assignments (n=25) in addition to the exams, while it is also observed that one or several of the projects, practices, discussions, Q&A, brainstorming, role playing, team, report, performance, presentation, research and reading are also included.

In line with the research question of “How compatible are the measurement&evaluation methods in the information packages of compulsory professional instructional (pedagogical) knowledge courses named "Teaching Principles and Methods" and "Instructional Technologies" in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, with the program accreditation?”, firstly the availability of measurement&evaluation methods is presented in Table 11 as concluded from the examination performed.

**Table 11. Availability of measurement&evaluation methods**

| Courses | Measurement&evaluation methods | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Available | | | | Not available | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 10 | 3 | 32 | 3 | 0 | 0 | 6 | 0 |
| Instructional Technologies | 9 | 2 | 33 | 3 | 2 | 2 | 5 | 0 |
| Total | 19 | 5 | 65 | 6 | 2 | 2 | 11 | 0 |
| | 24 | | 71 | | 4 | | 11 | |
| | 95 | | | | 15 | | | |
| | 110 | | | | | | | |

As can be seen in Table 11, 95 of the 110 information packages include measurement&evaluation methods, while measurement&evaluation methods are not available in 15 information packages. In the context of the availability of the measurement&evaluation methods:

- Taking into account the accreditation status, it has been concluded that while 71 of the 82 information packages for non-accredited programs include measurement&evaluation methods, 11 of them do not include available measurement&evaluation methods. It is observed that measurement&evaluation methods are available in 24 of 28 information packages for accredited programs, while measurement&evaluation methods are not available in the other 4.
- Taking into the account whether the university is a public or private university, it has been concluded that 84 of the 97 information packages in public universities include measurement&evaluation methods, while 13 of them do not include measurement & evaluation methods. It is observed that measurement&evaluation methods are available in 11 of 13 information packages, while they are not available in the other 2 in private universities.

The situation regarding the compatibility of the measurement&evaluation methods with the program accreditation is presented in Table 12.

**Table 12. Compatibility of measurement&evaluation methods with the program accreditation**

| Courses | Measurement&evaluation methods | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Compatible | | | | Incompatible | | | |
| | Accredited | | Nonaccredited | | Accredited | | Nonaccredited | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Teaching Principles and Methods | 7 | 2 | 13 | 2 | 3 | 1 | 19 | 1 |
| Instructional Technologies | 5 | 2 | 15 | 3 | 4 | 0 | 18 | 0 |
| Total | 12 | 4 | 28 | 5 | 7 | 1 | 37 | 1 |
| | 16 | | 33 | | 8 | | 38 | |
| | 49 | | | | 46 | | | |
| | 95 | | | | | | | |

As can be seen in Table 12, it is observed that measurement&evaluation methods are compatible in 49 of the 95 information packages, while it is observed that they are not compatible in 46 of the packages. In the context of the compatibility of measurement&evaluation methods:

- Taking into account the accreditation status, it has been concluded that the measurement&evaluation methods in 33 of the 71 information packages for non-accredited programs are compatible, while they are not compatible in the other 38. For accredited programs, it is observed that the measurement&evaluation methods are compatible in 16 of the 24 information packages, while they are not compatible in the other 8 packages.
- Taking into the account whether the university is a public or private university, it has been concluded that the measurement&evaluation methods in 40 of the 84 information packages in public universities are compatible, while they are not compatible in the other 44. It is observed that 9 of the 11 information packages at private universities include compatible measurement&evaluation methods, while the measurement&evaluation methods in 2 of the packages are not compatible.

It is observed that only midterm and final exams are included in the tables related to the evaluation system in the context of the compatibility of measurement&evaluation methods. However, for compatible measurement&evaluation methods, it is also observed that one or several of the assignments, presentations, project, report, performances and presentation are also included in addition to the midterm and final exams.

## DISCUSSION

According to Harvey and Green (1993), several viewpoints on the concept of quality are considered in terms of the stakeholders' relative importance. However, the fact that there are several interpretations shouldn't stop it from preserving and advancing it. On the other hand, Newton (2013) highlights that national organizations and institutions of higher education should put this on their agenda and that they should be monitored, enhanced, and developed. Here, the accreditation process follows the evaluation steps, which results in a report submitted by the external review committee (Van Vught & Westerheijden, 1994). In this study, the focus is on examining the course information packages realized in this process. In accordance with the transparency principle of the Bologna process, making available the relevant course information package on the web pages qualifies as a document for international recognition (Timurcanday Özmen et al., 2015). While this study suggests that approximately two-thirds of the information packages are not available. Considering both accredited and non-accredited programs, it is possible to convey that approximately two-thirds of the information packages are not accessible. This is an unexpected situation, particularly for accredited programs. It once again emphasizes the importance of the monitoring accredited programs (THEQC, 2020) and the continuous follow-up of the process (Kısa, Uysal & Kavak, 2020).

Based on the types of universities, it is noted that while two-thirds of the information packages are inaccessible at public universities, approximately half of them are inaccessible at private universities. Although the frequency is very low, among the reasons for unavailability of course information packages are the failure to access the related interface and the error given by the relevant web page. This may also indicate that there are still problems regarding the preparation of the information packages. For example, Fer et al. (2019) stated that among the problems regarding the preparation of the information packages are the lack of information flow, the lack of understanding of the quality of the process and not believing in its significance, the unfair division of tasks, and the incompatibility of the program qualification with the course. Erkuş (2009) also stated in their research that more than half of the instructors do not have adequate knowledge about the accreditation of the program in the faculty of education.

In the context of the objective of the course; it has been concluded that almost all of the course information packages include an objective, both in general and according to their accreditation status. Taking into account the types of universities, it is possible to convey that almost all of the information packages include an objective in public universities, while almost half of the information packages in private universities lack a course objective. As for the compatibility of the course objective, and both in general terms and based on their accreditation status and the type of university approximately half of the information packages were incompatible. This situation emerges from the fact that the objective is for the student, that the objective provides only the content – although the frequency is low, and that there is expressional ambiguity in the objective. In particular, the fact that the phrases are aimed at the student indicates that the learning outcomes are mistaken with the objective of the course. However, while the course objective should be directed toward the instructor, the learning outcomes should be for the student (CoHE, 2010).

In the context of learning outcomes: it has been concluded that there are outcomes for all courses except for one course at a non-accredited public university. Although this is an expected situation in accredited programs, it is also a favorable situation in terms of non-accredited programs in particular. Learning outcomes are the focus in ensuring that the instruction is carried out duly (Morrison, Ross, Morrison & Kemp, 2019). In terms of compatibility of learning outcomes, slightly more than half of the information packages were deemed incompatible both in general and according to their accreditation status and in public universities. This is the case for exactly half of the information packages in private universities. Among the ones that are incompatible, the majority consist of those that fail to meet the requirements of both being specified with an observable and measurable action and being at a number between 5 and 9. This is followed by including more than one action and then being in more or fewer than the required number. Learning outcomes are expected to include what students are expected to do and know, namely the action/activity (EHEA, 2015). While surely being required in all fields, proper statement of learning outcomes is at the top of the list of points to take into consideration especially for the field of curriculum and instruction considering the expertise.

In the context of resources: it has been concluded that resources are available in almost all of the course information packages, both in general and according to their accreditation status, and also based on the types of universities. It is possible to convey that this is a positive development in terms of the requirements to be fulfilled. In the context of activities: similar to the resources, it has been concluded that activities are available in almost all of the course information packages, both in general and according to their accreditation status, and also based on the types of universities. While this is expected in accredited programs, it is also a favorable situation especially for non-accredited programs. In terms of compatibility of the activities, it can be stated that four-fifths of the information packages are compatible in general. Based on the accreditation status and the type of universities, it is possible to convey that approximately three-quarters of those in non-accredited programs or at public universities, and almost all of those in accredited programs or at private universities are compatible. While the study of Uysal & Özkan Elgün (2022) suggests that more learning outcomes should be included at the levels of practice and above for the Teaching Principles & Methods course, "Teaching Principles and Methods" and "Instructional Technologies" courses require different activities due to their objectives and learning outcomes. On the other hand, there are course information packages deemed incompatible due to the fact that they only include midterm and final exams. Among those that are compatible, the majority include only homework in addition to the midterm and final exams, while there are also information packages that include one or several of the projects, practices, discussions, Q&A, brainstorming, role playing, team, report, performance, presentation, research and reading.

In the context of measurement&evaluation methods, similar to activities and resources, it has been concluded that almost all of the course information packages include measurement&evaluation methods, both in general, according to their accreditation status, and based on the type of university. Although this is expected in accredited programs, it is also a favorable situation in terms of non-accredited programs in particular. In the evaluation of learning outcomes, it is envisaged to use an evaluation method that is compatible with the principles of transparency and reliability, consistency, flexibility and that is diversified as much as possible (EHEA, 2015). According to Gelbal and Kelecioğlu (2007), some of the evaluation methods that can be used in the evaluation of students are projects, performance assignments, peer assessment, self-assessment, short answer tests, multiple choice tests, written probes, oral exams, observation and interview. In terms of the suitability of assessment-evaluation methods for program accreditation, whether they are suitable for the purpose of the course is examined (EPDAD, 2021a, 2021b). As for the measurement&evaluation methods, it can be stated that half of the information packages do not include compatible methods. It has been concluded that slightly more than half of the programs that are accredited or in a public university include incompatible tools. It is possible to convey that two thirds of accredited programs and almost all of private universities have compatible tools. Similar to the explanations for the activities, the "Teaching Principles and Methods" and "Instructional Technologies" courses require the availability of different tools based on their objectives and learning outcomes. On the other hand, there are incompatible course information packages due to the fact that they only include midterm and final exams. There are also information packages that include one or several of the assignments, presentations, project, report, performances and presentation in addition to the midterm and final exams. In general, it is a favorable development that no problem is encountered in terms of the availability of course objectives, learning outcomes, resources, activities and of measurement-evaluation methods. It is also noted that particularly the activities and measurement&evaluation methods in private universities or accredited programs precede in terms of compatibility with accreditation.

## CONCLUSION AND RECOMMENDATIONS

Within the scope of the study, the information packages of "Teaching Principles & Methods" and "Instructional Technologies" courses that are compulsory professional instructional (pedagogical) knowledge courses in elementary school mathematics education programs of the Faculty of Education, for which only the field of curriculum and instruction is responsible within educational sciences, were reviewed in the context of program accreditation. It is concluded that approximately two-thirds of packages are incompatible. Almost all packages include the course objective, learning outcome, resources, activities and measurement&evaluation tools. Particularly the activities and measurement&evaluation methods in private universities or accredited programs precede in terms of compatibility with accreditation. Policies of the university or faculty of education or supervision is very important. However, generally in packages, the order of the elements from the most to the least compatible with the accreditation program is as follows; activities, learning outcomes, course objective, and measurement&evaluation methods. Furthermore, it is noted that course packages are still not viewable. In terms of being compatible for certification, while certified programs are likely to have advantages over others, it is also probable that they may face comparable challenges. All of the abovementioned issues contribute to the emphasis on the importance of monitoring and improvement (THEQC, 2020).

In line with the results obtained, the following suggestions can be provided to implementers and researchers:

- The university and faculty administrations could initiate practices in cooperation in line with the policies they have developed or currently developing for quality assurance and accreditation. Of course, academic staff should not be overwhelmed with bureaucracy. In-service training, seminars or workshops can be organized for instructors for the preparation of course information packages, which are also important in the context of accreditation. To allow accredited programs progress taking into account the fact that monitoring activities will be carried out later on, it is considered important to support them.
- The focus of the study was on one field only. Studies could be carried out based on other professional instructional knowledge courses or any other type of teaching.

- Research can be done by considering not only the preparation of course information packages, but also other stages. In addition, the accreditation process as a whole can be viewed as program evaluation.
- Through a SWOT analysis for the accreditation process, the strengths, weaknesses, opportunities of, and threats from the accreditation can be identified for both instructors and students. This may ensure a needs analysis is performed both specifically for the preparation of course information packages and for the process in general.

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The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


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## Statements of publication ethics

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

## Researchers' contribution rate

The study was conducted by one author.

## Ethics Committee Approval Information

"Ethics Committee Approval Document" is not necessary in this study.

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| Research Article / Araştırma Makalesi |

# Investigation of the Relationship Between Cognitive Flexibility Levels and Social Interest Levels of University Students

# Üniversite Öğrencilerinin Bilişsel Esneklik Düzeyleri ile Sosyal İlgi Düzeyleri Arasındaki İlişkinin İncelenmesi

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**Keywords**

1. Cognitive flexibility
2. Social interest
3. Moderation effect

**Anahtar Kelimeler**

1. Bilişsel esneklik
2. Social ilgi
3. Düzenleyici etki

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## Abstract

*Purpose:* In this study, the relationship between the cognitive flexibility score of university students and their social interest levels was investigated. In line with this main purpose; the moderator role of variables such as age, department and grade on this relationship was also examined.

*Design/Methodology/Approach:* The participants of the study consist of, 344 female and 256 male totally 600 undergraduate students. The research was designed in correlational survey model. "Social Interest Scale" and "Cognitive Flexibility Inventory" were used to collect data. SPSS PROCESS was used in the analysis of the data. The linear regression statistical technique was used to determine the moderation effect.

*Findings:* Positive and significant relationship at medium level was observed between cognitive flexibility and social interest levels of university students. Results; social interest, age, and department are significant predictors of cognitive flexibility.

*Highlights:* It was observed that high social interest scores caused an increase in the cognitive flexibility scores of the participants in the group at the age of 24 years and older. While the moderation effect of social interest on cognitive flexibility is at the highest level in psychological counseling and guidance department considering undergraduate students, this group is followed by undergraduate students from primary school teaching and preschool teaching departments, respectively.

## Öz

*Çalışmanın amacı:* Bu çalışmada, üniversite öğrencilerinin bilişsel esneklik düzeyleri ile sosyal ilgi düzeyleri arasındaki ilişki incelenmiştir. Bu temel amaç doğrultusunda; yaş, bölüm ve sınıf düzeyi değişkenlerinin bu ilişki üzerindeki düzenleyici rolüne de bakılmıştır. Araştırmanın katılımcılarını 344'ü kadın 256'sı erkek toplam 600 lisans öğrencisi oluşturmaktadır.

*Materyal ve Yöntem:* Araştırma ilişkisel tarama modelinde tasarlanmıştır. Verilerin toplanmasında, "Toplumsal ilgi Ölçeği" ve "Bilişsel Esneklik Envanteri" kullanılmıştır. Verilerin analizinde SPSS PROCESS kullanılmıştır. Düzenleyici etkinin belirlenmesi için lineer regresyon istatistiksel tekniği kullanılmıştır.

*Bulgular:* Üniversite öğrencilerinin bilişsel esneklik ile sosyal ilgi düzeyleri arasında pozitif yönde ve orta düzeyde anlamlı ilişki olduğu görülmüştür. Bulgular; sosyal ilgi, yaş ve bölümün bilişsel esnekliğin anlamlı birer yordayıcısı oldukları yönündedir.

*Önemli Vurgular:* Yüksek sosyal ilgi puanlarının en çok 24 yaş ve üzeri gruptaki katılımcıların bilişsel esneklik puanlarında artışa neden olduğu görülmüştür. Sosyal ilginin bilişsel esneklik üzerindeki düzenleyici etkisi rehberlik ve psikolojik danışmanlık lisans öğrencilerinde en yüksek düzeyde iken, bu grubu sırasıyla sınıf öğretmenliği ve okul öncesi öğretmenliği lisans öğrencileri izlemektedir.

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## INTRODUCTION

Individuals can encounter different life problems at each period of development. These problems differ according to age, gender, developmental period and personality characteristics of the individual. In this process, it is important for individuals to be able to produce alternative solutions to the problems they encounter with different perspectives and to establish healthy relationships with their environment in order to adapt quickly to the changes that occur in their lives. According to the cognitive behavioral approach, cognitive restructuring of the mind and executive functions' being more active are related to the transitions between thoughts. Especially, developing functional thoughts instead of automatic negative thoughts, which are more common in individuals with depression, is a condition that requires cognitive change and cognitive flexibility (Dennis & Wall, 2010; Johnco, Wuthrichand, & Rapee, 2014). According to Martin and Andersan (1998), cognitive flexibility includes three important situations. First of all, cognitive flexibility includes an individual's awareness of any subject. Second, it includes being cognitively flexible and willing to adapt to the situation, and finally, it includes one's beliefs about self-efficacy and flexibility. Cognitive flexibility is defined as "a quality of human cognition" and an aspect of executive performance. Executive performances are a set of interconnected internal skills such as controlling, planning and organizing desires considered necessary for higher up mental functions such as problem solving and creativity. In general, the main element of cognitive flexibility is the individual's ability to adapt to changing environmental stimuli (Rahimi, Meratian, & Mahmoodabadi, 2018). At this point, the necessity of cognitive flexibility concept for psychological adjustment was noticed and the need to investigate the subject in detail emerged.

Alfred Adler was one of the first theorists who emphasized the social aspect of human beings and examined the relational context of family members (especially sibling relationships) in psychology literature (Bacanlı, 1997; Corey, 2008, Geçtan, 2017). In general, the individual, then the family and the society which is formed by the union of families, take place at the first step of the Adler's approach. Alfred Adler, who emphasized the individual's unique social environment and the importance of interaction with the environment in shaping behaviors, named his theory "Individual Psychology" (Schultz & Schultsz, 2017). According to Adler's theory of individual psychology, all behaviors of the individual is social. Considering this situation, perhaps social interest is emphasized as the most prominent concept of the theory (Akçabozan & Sümer, 2016). According to Adler, social interest is the main characteristic of every individual and it is involved in all actions. As social interest develops, so does the mind, because intelligence is a social function (Ansbacher, 1991). According to Adler, social interest develops with potential consciousness which is innate. An individual, whose social interest is sufficiently developed, makes efforts to cope with life struggles and strives for self-realization. Social interest involves conceptions such as cooperation, equality of all humanity, acceptance of others and self, contributing to humanity, showing respect and taking responsibility (Soyer, 2004). Likewise, Mosak (1991) states that individuals with high social interest can accept other people's and their own mistakes, strive to contribute to the welfare of the society, have high self-confidence and they are open to cooperation.

Adler states that the main feature of normal and healthy behaviors is the ability to deal with various problems that people face in their environment effectively. People constantly encounter problems throughout their life. Being able to overcome these problems is related to individual's ability to solve problems at a certain level. Producing solutions to problems requires certain flexibility in thought patterns (Geçtan, 2017). When the literature is examined it is clearly understood that a person must have a certain social interest potential in order to develop this flexibility (Ansbacher, 1991; McClain, 2005). Considering all these findings, individuals, who need care, support and socialization from the moment of birth, are supposed to have a certain level of cognitive flexibility and social interest in order to adapt to the existing world order, be strong against the problems and develop social-cognitive aspect in a balanced way. Adler states that social interest is necessary for mental health, affects the behavior, emotions and thought processes, and encourages the individual. This provides a certain level of flexibility in the behavior and cognitive processes of the individual and encourages social development (McClain, 2005). In this study, based on all these findings, it was thought that the individual's cognitive flexibility and social interest level might be related to each other, and the relationship between these two variables was examined based on this conceptual context.

Young adulthood period can be considered as a period in which young people, especially those who study at university, gain their autonomy regarding their own lives and fulfill many developmental tasks. During this period, students can also encounter various developmental problems and develop various skills to solve these problems. Among the problems experienced by many university students, situations such as social adaptation, economic difficulties, future anxiety, separation from the family for university education, efforts to adapt to a new socio-cultural environment, differences in interpersonal relations, etc. are included. When it comes to the steps to solve these problems, it is possible for students to use the options around them positively and indicate a rapid cognitive and social development as well as indicating a behavior which is just the opposite. Since it is thought that these differences among students' perspectives and how they handle developmental problems in this important period of preparation for adulthood and life can be related to their cognitive flexibility and social interest levels, this issue needs to be investigated.

Other points that emphasize the importance of examining these two concepts together are as follows: Adler considered social interest as a cognitive function that is potentially innate but needs to be developed consciously (Ansbacher, 1991a). Kaplan (1991a) discussed social interest considering cognitive, affective and behavioral dimensions and emphasized the importance of "compromising and flexible" concept in solving life problems. In addition to this situation, Adler discussed social interest as an indicator of mental health; considered the reason for maladaptive behaviors of the individual as lack of social interest, and pointed out that maladaptive behaviors must be replaced with adaptive behaviors in order to have high social interest (Soyer, 2001). Basically the meaning of the cognitive flexibility concept can be summarized as being able to adapt, to approach problems with a

flexible perspective, to produce alternative options, to establish positive, harmonious and balanced interpersonal relationships (Martin & Anderson, 1998).

### Purpose and Importance of the Research

Considering the content of cognitive flexibility and social interest concepts, it can be stated that they are related. When this relationship between the two concepts is examined, as the cognitive flexibility level of the individual develops so the development of social interest level of the individual is expected, and because of this relationship, this issue constitutes the focus of the research.

The main purpose of this research is to investigate the relationship between the cognitive flexibility levels of university students and their social interest levels. In line with this main purpose, the moderator role of variables such as age, department of education and grade level in the relationship between university students' cognitive flexibility and social interest levels was also discussed in the study. In line with this main purpose, answers to the following questions were searched in the study:

1-Is there a significant relationship between cognitive flexibility levels of university students and their social interest levels?

2-What is the moderator role of age in the relationship between cognitive flexibility levels of university students and their social interest levels?

3-What is the moderator role of department in the relationship between cognitive flexibility levels of university students and their social interest levels?

4-What is the moderator role of grade in the relationship between university students' cognitive flexibility levels and their social interest levels?

## METHOD

This research is a descriptive study using the correlational survey model. Correlational survey is a research model that aims to determine the presence and/or level of covariance between two or more variables (Karasar, 2016). In this study, first of all, the existence and level of the relationship between cognitive flexibility levels of university students and their social interest levels was aimed to be explained by using the correlation type correlational survey model. In a study, the variables that can affect the direction and the strength of the relationship between dependent and independent variables are called moderating variables (Gürbüz & Şahin, 2018). Moderation effect analysis is used when it is aimed to determine whether the relationship between two variables depends on the value of a third variable cluster (Hayes, 2012). After examining the existence and level of the relationship between dependent variable (cognitive flexibility) and independent variable (social interest) in the study, moderation effects of age, department and grade variables on the relationship between university students' cognitive flexibility levels and social interest levels were examined.

### Participants

The study group of the research consists of 344 female and 256 male totally 600 undergraduate students, who live within the cities of Ankara and Konya and continue their education in the 1st and 4th grades of Gazi University Gazi Faculty of Education and Necmettin Erbakan University Ahmet Keleşoğlu Faculty of Education in the spring semester of 2018-2019 academic year, and volunteered to participate in the research. Information regarding the demographic characteristics of the participants in the study group is given in Table 1.

**Table 1. Descriptive statistics regarding demographic characteristics of the participants in the study group**

| Variables | | Frequency (f) | Percentage (%) |
|---|---|---|---|
| Gender | Female | 344 | 53,7 |
| | Male | 256 | 42,7 |
| | Total | 600 | 100 |
| Age | 18-20 | 214 | 35,7 |
| | 21-23 | 323 | 53,8 |
| | 24+ | 63 | 10,5 |
| Department | PCG | 211 | 35,2 |
| | Primary School Teaching | 175 | 29,2 |
| | Preschool Teaching | 214 | 35,7 |
| Attending University Near or Apart From Family | Apart From Family | 381 | 63,5 |
| | Near Family | 219 | 36,5 |
| Mother Educational Status | Illiterate | 17 | 2,8 |
| | Primary School | 312 | 52,0 |
| | Secondary School | 116 | 19,3 |
| | High School | 97 | 16,2 |
| | University | 56 | 9,3 |

| | | | |
|---|---|---|---|
| | Postgraduate | 2 | ,3 |
| | Illiterate | 2 | ,3 |
| Father Educational Status | Primary School | 162 | 27,0 |
| | Secondary School | 119 | 19,8 |
| | High School | 163 | 27,2 |
| | University | 144 | 24,0 |
| | Postgraduate | 10 | 1,7 |
| University | Gazi University | 313 | 52,2 |
| | Necmettin Erbakan University | 287 | 47,8 |

When Table 1 is examined in terms of gender variable, it is seen that the number of female (53.7%) participants is more than male (42.7%) participants. Considering the age rate, it is seen that the age range is mainly 21-23 (53.8%). Considering the department studied, it can be stated that the number of participants is close to each other among the three departments of PCG (35.7%), primary school teaching (29.2%) and preschool teaching (35.7%). In the research, the question whether the students continue their university education near the family or apart from the family was asked, which means being in a different city or not. According to this, it is seen that 63.5% of the students continue their university education in another city apart from their families. When the mothers' educational status is examined, it is seen that they are mostly at primary school level (52.0%). On the other hand there is a relatively more balanced distribution among primary school, secondary school, high school and university levels considering fathers' educational status. Finally, it can be stated that there is a balanced distribution in the number of participants of the two universities that constitute the study group.

## Measures

***"Personal Information Form"*** which was developed by the researcher, "Cognitive Flexibility Inventory" which was adapted into Turkish by Sapmaz and Doğan (2013), and "Social Interest Scale" which was adapted into Turkish by Soyer (2004) were used as data collection tools in this study. In the personal information form, there are items related to the participants' age, gender, university, department, grade, whether they studied at the university near the family or apart from the family, mothers' educational status, fathers' educational status and perceived socio-economic level.

***"Cognitive Flexibility Inventory"*** originally developed by Dennis & Wall (2010), consists of 20 items, 7 point Likert type and 2 sub-dimensions (control and alternatives). The inventory measures the tendency of individuals to perceive difficult situations as manageable, their ability to produce multiple alternative solutions to difficult situations, and the ability to perceive multiple alternatives for life events and human behaviors. Turkish adaptation of the scale was completed by Sapmaz and Doğan (2013) at the end of a two-stage process in which university students participated. The validity study of the scale was carried out with criterion-related validity, confirmatory and exploratory factor analysis methods. Factor analysis results indicated that the scale had a two-factor structure. Cronbach alpha reliability coefficient of the Cognitive Flexibility Inventory was obtained as .90 for the whole scale, .90 for "alternatives" sub-dimension, and .84 for "control sub-dimension". Test-retest reliability coefficient was found .75 for the whole scale, .78 for the "alternatives" sub-dimension and .73 for "control sub-dimension" (Sapmaz and Doğan, 2013). The final version of the scale was formed as a 5-point Likert type with 20 items. Three different types of scores can be obtained in the scoring; total cognitive flexibility score, "alternatives" sub-dimension score and "control" sub-dimension score (Sapmaz & Doğan, 2013).

In the reliability analysis conducted within the scope of this study, the Cronbach Alpha coefficient calculated for the total score of Cognitive Flexibility Inventory was .88; 84 for control sub-dimension and .90 for alternatives sub-dimension.

***"Social Interest Scale***" was originally developed as a 32-item scale by Greever, Tseng, and Friedland (1973). Turkish adaptation of the scale was made by Soyer (2004). The scale was first presented to the opinion of 10 experts who had profession on Alfred Adler's theory, and the translation validity of the scale was made. In accordance with the opinions of the experts, it was concluded that the items of the 32-item scale were insufficient in terms of reflecting social interest. The scale was initially increased to 110 items, and expert opinion was taken again and then it was reduced to 80 items. The 80-item version of the scale was applied to 400 university students. For the construct validity of the scale, factor analysis was performed with the principal component analysis method. Cronbach alpha internal consistency coefficient for the reliability of the scale was found ,88 and test-retest method was found ,82 (Soyer, 2004). The final version of the scale is a 52-item one-dimensional 5-point Likert-type rating scale. A high score obtained from the scale means high social interest (Soyer, 2004).

In the reliability analysis performed within the scope of this study; Cronbach Alpha coefficient calculated for the total score of Social Interest Scale was found .95. Obtaining Cronbach Alpha value above .70 indicates that the scale is reliable (DeVellis, 2016). Thus, it can be stated that the reliability coefficient is high.

## Data Collection Process

First of all, necessary permissions were taken in order to collect the research data and perform the application. The data was collected in a four-week period during spring term in May 2018-2019 academic year. The research was conducted with the 1st and 4th grade students studying in the undergraduate programs of Psychological Counseling and Guidance, Primary School Teaching,

and Preschool Teaching from Gazi University Gazi Faculty of Education (313 people) and Necmettin Erbakan University Ahmet Keleşoğlu Faculty of Education (287 people). Before the application, the participants were given detailed information about the content and purpose of the research.

### Analyzes of Data

IBM SPSS 25.00 package program was used in the analysis of the data collected within the scope of the research. Before analyzing the data, the data set was checked and errors were corrected. Then, items were reversed and unanswered items were examined. After these processes, kurtosis and skewness coefficients were examined in order to analyze whether the data indicated a normal distribution. Table 2 presents the results of kurtosis and skewness coefficient regarding the distribution of scores obtained from the total and sub-dimensions of the scales for normality test.

**Table 2. Analysis results of the scales regarding normality test: Kurtosis and skewness values**

| Measurement Tools | | Skewness | Kurtosis |
|---|---|---|---|
| Social Interest | Total Score | -,429 | -,129 |
| Cognitive Flexibility | Alternatives Sub-dimension | -,353 | ,275 |
| | Control Sub-dimension | -,138 | -,084 |
| | Total Score | ,145 | -,335 |

When Table 2 is examined, it is seen that skewness and kurtosis coefficients of the total and sub-dimension scores of the measurement tools are between -1.5 / +1.5. As a result, it was accepted that the scores obtained from the scales indicated normal distribution (Tabachnick & Fidel, 2007).

Parametric techniques were used in statistical analyzes performed after testing that the data indicated normal distribution. Cronbach alpha values were calculated in order to determine the reliability of the scales for this study group. In order to test the moderation effect, the correlation between dependent variable and independent variable must be significant (Baron & Kenny, 1986). Accordingly, in this study, social interest was considered as independent variable and cognitive flexibility as dependent variable, and Pearson Product Moment Correlation Coefficient was calculated to determine the relationship between social interest and cognitive flexibility variables, and a significant relationship was obtained (r= ,527; p<,01). Linear regression statistical technique was used in analyzes to determine whether there is a moderation effect or not. Process Syntax of Hayes (2012) was used while creating graphs for the variables.

While examining the moderation effects, first of all, all scale scores were standardized converting into (Z) scores. While the scores of participants obtained from the Cognitive Flexibility Inventory were included in the model as the predicted variable, the scores they obtained from Social Interest Scale and the variables of which moderator role was examined (age, department, grade) and "the variable of which moderator role was examined x Social Interest scores" were included in the model as predictive variables. While interpreting the results of the analysis, the t values and significance level of the variable "the variable of which moderator role was examined x social interest scores" was examined and it was decided whether the relevant variable had a moderator role or not (Hayes, 2017).

## FINDINGS

In the research, firstly, an answer was searched for the question "Is there a significant relationship between cognitive flexibility and social interest levels of university students?" Pearson Product-Moment Correlation Coefficient was calculated in order to determine the relationship between the scores obtained by university students from the sum of Social Interest Scale and Cognitive Flexibility Inventory and sub-dimensions. The results obtained are presented in Table 3.

**Table 3. Results of correlation analysis regarding the relationship between cognitive flexibility and social interest levels of university students**

| | Social Interest | Alternatives | Control | Cognitive Flexibility Total |
|---|---|---|---|---|
| Social Interest | 1 | | | |
| Alternatives | ,571** | 1 | | |
| Control | ,225** | ,292** | 1 | |
| Cognitive Flexibility Total | ,527** | ,870** | ,725** | 1 |

n= 600, **$p$ <,01

When Table 3 is examined, it is seen that there is a positive and significant relationship at medium level between cognitive flexibility levels of university students and their total scores of social interest levels ($r$= .527, $p$ <.05). While there is a positive and medium relationship between social interest and alternatives sub-dimension of Cognitive Flexibility Scale ($r$= .571, $p$ <.05), there

is a positive and significant relationship between social interest and control sub-dimension at low-level ($r$= .225, $p$ <.05). In line with these results, it can be stated that students with high social interest levels also have high cognitive flexibility levels.

Another question to be answered in the research was "What is the moderator role of age in the relationship between cognitive flexibility levels of university students and their social interest levels? The results of the linear regression analysis regarding the moderator role of age are presented in Table 4.

**Table 4. Results of regression analysis regarding the moderator role of age in the relationship between cognitive flexibility and social interest levels of university students**

| Variables | B | Standardized β | *t* | p |
|---|---|---|---|---|
| Age | 1,514 | ,095 | 2,736 | ,006 |
| Social Interest | 5,145 | ,483 | 4,498 | ,000 |
| Age x Social Interest | ,246 | ,043 | ,402 | ,688 |
| R=,536 | $R^2$=,28 | F= 80,085 | p=,000 | |

When Table 4 is examined, it is seen that age, social interest and "age*social interest" variables altogether explain 28% of cognitive flexibility (F=80,085, p<,001). When the results are evaluated together, while social interest ($t$= 4,498, $p$ <,05) and age ($t$ = 2,736, $p$ <,05) are significant predictors for cognitive flexibility; age*social interest variables ($t$=,402, $p$ >,05) are not significant predictors. Accordingly, it is not possible to mention a total moderator effect of age regarding the relationship between cognitive flexibility and social interest levels. Figure 1 indicates the graph created regarding the effect of age variable on the relationship between cognitive flexibility and social interest levels.

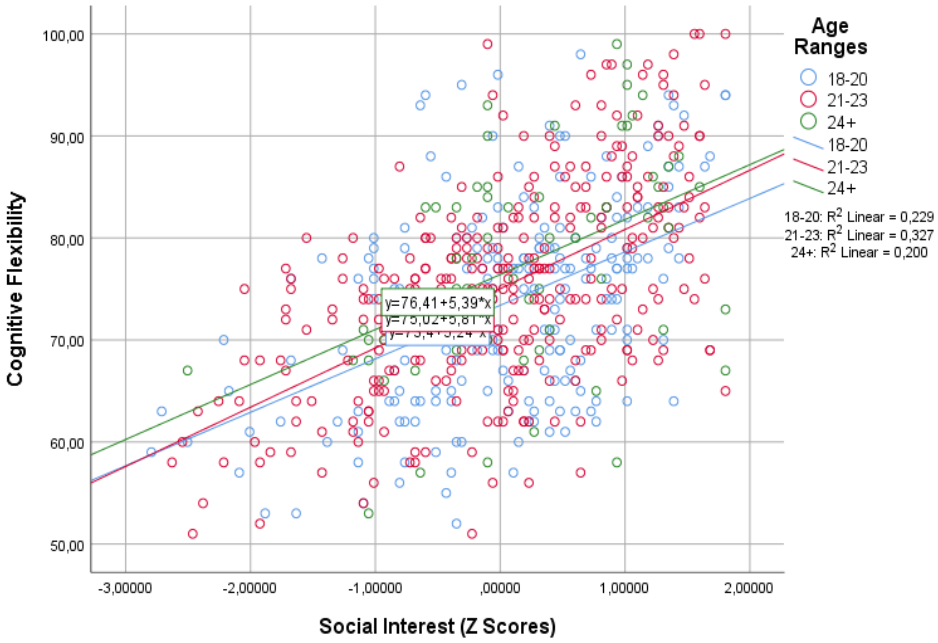


**Figure 1. The moderator role of age in the relationship between cognitive flexibility and social interest levels**

When Figure 1 is examined, it is seen that the colored bars are close to each other and there is a similar relationship between social interest and cognitive flexibility levels in all age groups. While low social interest scores decrease the cognitive flexibility scores of the participants in the 18-20 and 21-23 age groups, almost similarly, high social interest scores increase the cognitive flexibility scores of the participants in 24 and older age group. However, the group with the highest cognitive flexibility score among the three groups is the participants aged 24 and older. While the effect of social interest level on cognitive flexibility was higher in participants aged 21-23 ($R^2$=,327) this group was followed by participants aged 18-20 ($R^2$=,229) and those aged 24 and older ($R^2$=,200). Considering the fact that age groups of the participants were close to each other it can be stated that the moderator effect of age on the relationship between cognitive flexibility and social interest levels was not revealed. In addition, it is seen that the level of social interest, which increases as age increases, boosts the level of cognitive flexibility. At this point, it can be expressed that social interest and cognitive flexibility are skills that can be developed with increasing age.

Another question to be answered in the research was "What is the moderator role of the department in the relationship between cognitive flexibility and social interest levels of university students?" The results of the linear regression analysis regarding the moderator role of department in the relationship between these two variables are presented in Table 5.

**Table 5. Results of regression analysis regarding the moderator role of department in the relationship between cognitive flexibility and social interest levels of university students**

| Variables | B | Standardized β | *t* | p |
|---|---|---|---|---|
| Department | -1,692 | -,142 | -4,040 | ,000 |
| Social Interest | 6,910 | ,649 | 7,295 | ,000 |
| Department x Social Interest | -,477 | -,097 | -1,097 | ,273 |
| *R*=,546 | $R^2$= ,29 | *F*= 84,600 | *p*=,000 | |

When Table 5 is examined, it is seen that the variables of department, social interest and 'department*social interest' altogether explain 29% of cognitive flexibility in the established model (*F*= 84,600, *p* <,001). However, in the established model, while department (*t*=-4,040, *p*<.05) and social interest (*t*= 7,295, *p* <.05) were significant predictors for cognitive flexibility; department*social interest variables *(t*= -1,097 *p* >,05) were not significant predictors. In other words, it cannot be stated that department has a total moderation effect on the relationship between cognitive flexibility and social interest levels. In Figure 2, there is a graph created regarding the effect of department on the relationship between cognitive flexibility and social interest levels.


**Figure 2. The moderator role of the department in the relationship between cognitive flexibility and social interest levels**

When Figure 2 is examined, it is seen that colored bars are close to each other, in other words, there is a similar relationship between cognitive flexibility and social interest in all departments. While low social interest scores decrease cognitive flexibility scores of the students studying in Psychological Counseling and Guidance (PCG) and preschool departments at a similar level, it decreases the cognitive flexibility scores of the students studying in the primary school teaching department the most. High social interest scores increase cognitive flexibility scores of the students studying in the counseling department the most. While the effect of social interest on cognitive flexibility is the highest among students studying in the field of PCG ($R^2$=,339), this group is followed by students from the primary school teaching department ($R^2$=,333). It was determined that the effect of social interest on cognitive flexibility was the lowest in preschool teaching department ($R^2$=,234). When the findings of the study are examined, it is a remarkable result that the effect of social interest on cognitive flexibility is the highest in PCG students. It can be stated that the program content and professional basis of the PCG department is based on human relations and also PCG students receive more in-depth training on the cognitive, social, affective and behavioral development of the individuals compared to other fields might be effective in the emergence of such a result in the research. However, the departments of which moderator effects were investigated being affiliated to the same faculty and even partially the similarities in the student profile might not have totally reflected the moderator role of department in the relationship between cognitive flexibility and social interest.

The last question to be answered in the research was “What is the moderator role of grade in the relationship between university students' cognitive flexibility levels and their social interest levels?” The results of the linear regression analysis regarding the moderator role of grade are presented in Table 6.

**Table 6. Results of regression analysis regarding the moderator role of grade in the relationship between cognitive flexibility and social interest levels of university students**

| Variables | | B | Standardized β | *t* | p |
|---|---|---|---|---|---|
| Grade | | ,377 | ,056 | 1,619 | ,106 |
| Social Interest | | 5,801 | ,545 | 7,898 | ,000 |
| Grade x Social Interest | | -,058 | -,016 | -,235 | ,814 |
| *R*=,530 | $R^2$=,28 | *F*=77,576 | *p*=,000 | | |

When Table 6 is examined, it is seen that students' grade, social interest and 'grade *social interest' variables altogether explain 28% of cognitive flexibility (*F*= 77,576, *p* <.001). However, in the established model, while social interest was a significant predictor for cognitive flexibility (*t*= 7,898, *p* <.05), grade (*t*= 1,619, *p* >.05) and grade*social interest (*t*=-,235, *p* >,05) were not significant predictors of cognitive flexibility. In other words, it is not possible to mention a total moderator effect of grade on the relationship between cognitive flexibility and social interest. In Figure 3, there is a graph that indicates how grade affects the relationship between cognitive flexibility and social interest.


**Figure 3. The moderator role of grade in the relationship between cognitive flexibility and social interest levels**

When Figure 3 is examined, it is seen that colored bars are close to each other and there is a similar relationship between cognitive flexibility and social interest according to the grade. However when the situations, in which the high and low effects of grade on the relationship between cognitive flexibility and social interest, are compared, the moderator effect of grade is stronger in low social interest and cognitive flexibility scores; the moderator effect of grade is weaker in high social interest and cognitive flexibility scores. While low social interest scores decrease cognitive flexibility scores of the students studying in the 1st grade most, high social interest scores increase cognitive flexibility scores of the students studying in the 4th grade most. While the effect of social interest on cognitive flexibility is higher in 4th grade students ($R^2$=,282), it is lower in 1st grade students ($R^2$=,279).

When this finding of the study is examined, it is seen that grade variable does not have a total moderator effect on the relationship between cognitive flexibility and social interest. This situation can be interpreted as university education does not have an effect that makes a change in social interest and cognitive flexibility levels during the period between the 1st and 4th grade. External factors such as professional development and theoretical knowledge being predominant in the education programs of universities, students' anxiety about passing the courses and exams might have caused students turn to different activities that improve their social interest and cognitive flexibility levels. However, the grades which were examined correspond to the same developmental period (young adulthood). This situation can be taken into account as grade variable does not have a total moderator effect on the relationship between cognitive flexibility and social interest.

## DISCUSSION

According to the correlation analysis conducted to determine the relationship between university students' cognitive flexibility and social interest levels, which is the main purpose of this study, it was seen that there was a positive, significant relationship at medium level between the total scores of university students' cognitive flexibility and social interest levels. It was found that there was a positive correlation at medium level between the total scores of social interest and alternatives sub-dimension of Cognitive Flexibility Inventory, and a low-level positive correlation between control sub-dimension and total social interest scores. Although other studies, in which the variables of social interest and cognitive flexibility were directly discussed together, could not be found, some studies conducted regarding a similar theme in which social interaction of development and cognitive flexibility of the individual is indicated, support this finding of the research (Ansbacher, 1991, 1991a; Bandura, 1999; İşçioğlu, 2020; Koesten, Schrodt, & Ford, 2009; Mcclain, 2005; Martin & Rubin, 1995; Nikelly, 2005). In addition findings of the study by Ciairano, Bonino & Miceli, (2006) indicate that children with a high level of cognitive flexibility have a higher level of cooperation and social competence. Human development can be considered as a multi-directional concept, including cognitive, emotional and social processes. In addition, university life is a period that can offer individuals an abundance of experiences from different perspectives. It can be thought that this finding of the research can be considered as the social and cognitive development of individuals support and complete each other, and this situation is positively and significantly reflected on the relationship between students' cognitive flexibility levels and social interest levels.

Finding a positive and significant relationship between university students' cognitive flexibility and social interest levels in this study supports the content of the collective vision developed as a framework for 21st century learning. This vision was developed collaboratively by different companies and organizations in the USA such as Cisco, Apple, National Education Association, and was generally accepted and referenced in some studies by Brown (2018), Lamb, Maire, & Doecke, (2017) (Cansoy, 2018). In the content of this vision there are concepts that emphasize the meaning of cognitive flexibility such as flexibility, problem solving and adaptability to changes; skills that emphasize the content of social interest concept such as social and cultural skills, responsibility and cooperation that an individual must have for success and harmony in the 21st century (Partnership for 21st Century Learning-P21, 2009). In addition, Wagner (2008)'s study, which emphasizes the characteristics such as mental agility and flexibility, cooperation, entrepreneurship and problem-solving skills that individuals must have in order to be successful, is similar. As a result, the findings of the research reflect and support the studies of previous researchers who stated that being able to indicate a balanced social and cognitive development, creating right solutions to problems, seeing alternative options in difficult situations require a certain flexibility in thought patterns, and that the individual must have a certain social interest potential in order to develop this flexibility (Ansbacher, 1991; Geçtan, 2017; Mcclain, 2005; Nikelly, 2005).

Considering the results of the regression analysis regarding the moderator role of age in the relationship between university students' cognitive flexibility and social interest levels, it is not possible to mention a complete moderator effect of age. It was understood that age, social interest and “age x social interest” variables altogether explained 28% of cognitive flexibility. However, when social interest and age variables are considered separately, they are significant predictors of cognitive flexibility; age did not have a moderator effect on the relationship between cognitive flexibility and social interest. Also among the three age groups (18-20, 21-23 and 24 years and older), the group with the highest cognitive flexibility is the participants aged 24 and older. This finding of the study supports the studies that cognitive flexibility increases with age (Atayeter, 2020; Bock, Gallaway, & Hund, 2015; Çiftçi, 2017; Üzümcü & Müezzin, 2018). Another result of the study is that high social interest scores increase the cognitive flexibility scores of the participants who are in the age group of 24 and older most. Individuals in this age group are majorly in the fourth grade. As a natural consequence of this, it can be stated that this age group was able to adapt better to university life and differences, have different experiences, have more advanced cognitively and develop themselves. In short, they can be considered as individuals who learn more, produce more and become more open to socialization. This finding of the study can be summarized as increasing the level of social interest as the age increases, causing an increase in the level of cognitive flexibility. At the same time, this finding supports the results of studies indicating that the level of social interest increases as age increases (Greverr, Tseng & Friendland, 1973; Meunier & Royce, 1988).

When the relationship between cognitive flexibility and social interest level of university students is considered from general view it was found that the group at the age of 21-23 differentiated this relationship more clearly. This age group corresponds to the middle of the developmental period, which Arnett (2000) considers as emerging adulthood (18-25 years old). In summary it is the period in which individuals focus on themselves most, have the opportunity to make use of the opportunities around, deciding individually in many different areas, in short, when they are most free and have social interaction most (Arnett, 2015; Atak & Çok, 2010). From this point of view, the age range of 21-23 can be considered as the period in which many social, cognitive and emotional changes and developments are experienced the fastest and the individual is most open to self-development. Therefore the difference between the situations, where low and high effects of the 21-23 age range on cognitive flexibility and social interest relation, can be more apparent.

Considering the results of the regression analysis on the moderator role of the department (PCG, primary school teaching and pre-school teaching) in the relationship between the cognitive flexibility and social interest levels of university students, it is seen that it is not possible to mention a total moderation role of department. It was seen that the variables of department, social interest and “department x social interest” altogether explained 29% of cognitive flexibility.

In addition, when social interest and department variables are considered separately, whereas they are significant predictors of cognitive flexibility; department did not have a moderation effect on the relationship between cognitive flexibility and social interest. Considering the fact that all three of the compared departments are from the faculty of education and they are from the field of social sciences it can be stated that this situation might have affected the department's lack of a moderator effect on the relationship between social interest and cognitive flexibility. In this study, it was concluded that high social interest scores increase cognitive flexibility scores of the students who study in PCG most. Psychological Counseling and Guidance (PCG) is a field based on human relations that requires one-to-one and face-to-face communication with the individual, requiring an empathetic understanding, unconditional positive acceptance and helping individuals who need psychological support. Therefore, it can be stated that high level of social interest of an individual, who preferred to study PCG, is a precondition for basic counseling skills that are expected and required in this profession. As a result, if the effect of social interest on cognitive flexibility is lined up according to the fields examined this effect is seen in the students studying in PCG department at the highest level, and it is followed by the students in primary school teaching and preschool teaching, respectively. In a study investigating whether cognitive flexibility levels of students studying primary school teaching and preschool teaching differ according to the department or not, it was found that there was no significant difference between the two departments (Esen-Aygun, 2018). This finding supports the results of this study, albeit indirectly. Factors such as primary school teaching and pre-school teaching are included in the Elementary School Department, and there is no major difference in the content of the education programs except for the field education courses, and the students' having similar cognitive functions might have been effective in the emergence of such a result.

According to the results of the regression analysis on the moderator role of grade in the relationship between university students' cognitive flexibility and social interest levels, it is seen that grade does not have a total moderator effect. Students' grade, social interest levels and "grade x social interest levels" variables altogether explain 28% of cognitive flexibility. It was understood that the effect of social interest level on cognitive flexibility level was higher in students attending the fourth grade, while it was lower in students attending the first grade. Considering the grade levels examined, the students studying in the 1$^{st}$ and 4$^{th}$ grades are in the same developmental period as young adulthood, and their age is close to each other might have been effective in students' having similar social interest and cognitive flexibility levels. Therefore, the moderator effect of grade might not have been observed in the relationship between cognitive flexibility and social interest. There are studies based on the relational correlation method in which social interest and cognitive flexibility levels are examined with grade variables in different studies separately. Considering the studies in which social interest is examined according to the grade in the study of Soyer (2001) the social interest scores between 1$^{st}$ and 4$^{th}$ grade students were examined. While the average social interest score of the 4$^{th}$ grade students was 166,05, 4$^{th}$ grade students' score was 164,98. As a result, no statistically significant difference was found between social interest and grade. Önal (2019) compared the social interest levels of university students with their grade levels and found that although there was a slight increase in their scores as the grade level increased in 1$^{st}$, 2$^{nd}$, 3$^{rd}$, and 4$^{th}$ grade students, when the scores of 1$^{st}$ and 4$^{th}$ grade students compared it was concluded that there was no statistically significant difference between social interest and grade. Considering the studies examining cognitive flexibility in terms of grade, Yücel, Karahoca & Karahoca (2016 made a comparison between 2$^{nd}$ and 3$^{rd}$ grades and found no significant difference. Başpınar (2019), on the other hand, made a comparison between the 1$^{st}$, 2$^{nd}$, 3$^{rd}$ and 4$^{th}$ grades of the university students and found that 4$^{th}$ grade students had the highest cognitive flexibility. Here, again, it is seen that the age factor plays a role in the 4$^{th}$ grade students having the highest cognitive flexibility, and cognitive flexibility increases with increasing age.

Considering the studies conducted, it was determined that the comparisons between grade levels are mainly aimed at university students. A comparison to be made between different education levels and grade levels (such as high school) can reveal more significant results in terms of both social interest and cognitive flexibility levels in order to see the change between grades in the relationship between these two variables. The period until university, that is, the time from adolescence to the age of twenties is of great importance for the individual. Individuals mainly complete their basic development and basic education-teaching process (Chisholm & Hurrelmann, 1995). In other words, it can be stated that, individuals come to university when they complete the most basic steps of social and cognitive development. Therefore, having reached a certain level of maturity and coming to university with a largely established level of social interest and cognitive flexibility might not have created a significant difference between grade levels at the university. In addition, a longitudinal study to be carried out on the same sample group in order to see the differences between grade levels can give more specific results in terms of evaluating the differentiation between the acquisitions and grade levels.

Besides all this, in a recent study examining the moderator role of cognitive flexibility, it was found that cognitive flexibility was associated with social intelligence and decision-making styles. It has been found that the effect of social intelligence on decision-making styles increases when cognitive flexibility is high (Karamanlıoğlu & Basım, 2022). In other recent study, cognitive flexibility demonstrated a significant moderating effect on the relationship between stress and psychological symptoms (Bozorgi Kazerooni & Gholamipour, 2023).

## CONCLUSION AND RECOMMENDATIONS

In line with the findings of the study, the following recommendations can be made: This research, which is focused on social interest and cognitive flexibility, is a cross-sectional study using the correlational survey model. In the research, it was concluded

that as age increases, social interest increases cognitive flexibility in the relationship between social interest and cognitive flexibility. Longitudinal studies can be conducted in order to see how the changes in individuals' social interest and cognitive flexibility levels maintain over time. Thus, the effect of the age variable on the relationship between these two variables can be examined more clearly.

In this study, the departments of which moderation effect was examined on the relationship between social interest and cognitive flexibility levels were limited to education faculty students on the grounds that the easily accessible sampling method was preferred. More comprehensive studies can be conducted involving different faculties or teaching levels. In line with the result of this research there is a positive and significant relationship at medium level between students' social interest and cognitive flexibility levels; interdisciplinary studies, in which individual differences are closely followed by psychological counselors, teachers and school administrators, can be conducted and course contents that prepare the individual not only academically but also for life as a whole can be prepared. Adler emphasizes that school environment provides a great opportunity for the development of social interest in the individual. Social, cultural, scientific and artistic programs can be developed in which healthy bonds will be established between school, family and children.

## Declaration of Conflicting Interests

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## Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

## Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

## Ethics Committee Approval Information

This study was completed in accordance with the Helsinki Declaration. In line with this, the study was permitted by Gazi University-Assessment and Evaluation Ethics Sub-Study Group

**Ethics Committee Name:** Gazi University- Assessment and Evaluation Ethics Sub-Working Group

**Approval Date:** 28.05.2019 / No: 06

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| Research Article / Araştırma Makalesi |

# Investigation of the Relationship Between Middle School Students' Attitudes Towards Geometry and Perceived School Experiences[1]

# Ortaokul Öğrencilerinin Geometriye Yönelik Tutumları İle Algıladıkları Okul Yaşantıları Arasındaki İlişkinin İncelenmesi [1]

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**Keywords**

1. Attitude
2. Middle school students
3. Attitude towards geometry
4. Perceived school experiences

**Anahtar Kelimeler**

1. Tutum
2. Ortaokul öğrencileri
3. Geometriye yönelik tutum
4. Algılanan okul yaşantıları

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**Abstract**

This study was carried out to determine the relationship between 5th, 6th, 7th and 8th grade middle school students' perceived school experiences and attitudes towards geometry in the Southeastern Anatolia Region. The study also explored middle school students' perceived school experiences and attitudes towards geometry based on various demographic variables. The study, which was carried out using the relational screening model, was conducted with 607 middle school students selected by convenient sampling method. "Personal Information Form", "Scale of Attitude towards Geometry" and "Perceived School Experiences Scale" were used as data collection tools in the research. A moderate, positive and significant relationship was found between perceived school experiences and attitudes towards geometry as a result of the findings obtained in the research. Students' attitudes towards geometry were at "moderate" level and it was concluded that their attitude scores towards geometry significantly differed according to their achievement scores. In addition, students' perceived school experiences were at "high" level; differing based on gender and achievement scores. It was concluded that as the students' positive school experiences increased, their attitudes towards geometry increased as well. The research is unique in terms of determining the relationship between perceived school experiences and attitudes towards geometry.

**Öz**

Bu araştırmada, Güneydoğu Anadolu Bölgesinde resmi ortaokullarda öğrenim gören 5., 6., 7. ve 8. sınıf öğrencilerinin algıladıkları okul yaşantıları ile geometriye yönelik tutumları arasındaki ilişkinin belirlenmesi amacı ile yapılmıştır. Ayrıca ortaokul öğrencilerinin geometriye yönelik tutumları ile algıladıkları okul yaşantıları, demografik bilgilerde yer alan değişkenler açısından incelenmesi amaçlanmıştır. İlişkisel tarama modeli kullanılarak yapılan bu araştırmanın örneklemini, uygun örnekleme yöntemi ile seçilmiş 607 ortaokul öğrencisi oluşturmaktadır. Araştırmada veri toplama aracı olarak "Kişisel Bilgi Formu", "Geometriye Yönelik Tutum Ölçeği" ve "Algılanan Okul Yaşantıları Ölçeği" kullanılmıştır. Araştırmada elde edilen bulgular sonucunda; algılanan okul yaşantıları ile geometriye yönelik tutum arasında orta düzeyli, pozitif yönlü ve anlamlı bir ilişki bulunmuştur. Araştırma sonucunda öğrencilerin geometriye yönelik tutumları "orta" düzeyde bulunmuş olup; geometriye yönelik tutum puanlarının; başarı puanı değişkenine göre anlamlı farklılık gösterdiği sonucuna ulaşılmıştır. Ayrıca öğrencilerin algıladıkları okul yaşantıları "yüksek" düzeyde bulunmuş olup; öğrencilerin okul yaşantılarına yönelik algılarının cinsiyet ve başarı puanı değişkenleri açısından farklılaştığı tespit edilmiştir. Araştırma sonucunda öğrencilerin olumlu algıladıkları okul yaşantıları arttıkça geometriye yönelik tutumlarının arttığına ulaşılmıştır. Sonuçlardan yola çıkılarak önerilerde bulunulmuştur. Algılanan okul yaşantıları ile geometriye yönelik tutumları arasındaki ilişkinin belirlenmesi yönünden araştırma özgün nitelik taşımaktadır.

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## INTRODUCTION

Geometry associates the nature and the environment with mathematics in daily life. Geometry, which deals with concrete shapes, helps us to make sense of mathematics (Altun, 2015). Geometry is a field that helps the individual to make sense of abstract concepts while providing the development of thinking processes (Duatepe, 2000). Geometry teaching has been included in the curriculum since primary education. Based on the studies, it was determined that factors such as the teacher, teaching methods, material use, students' physical-psychological characteristics, school-classroom environment and students' attitudes towards geometry affect the students' understanding of geometry and their achievements in geometry (Altun, 2015; Aydoğdu, 2003, Olkun and Aydoğdu, 2003; Sarıaslan and Küçük Demir, 2019). Studies provide suggestions such as planning the teaching process, developing new materials, teaching by making students aware of the environment instead of directing them to use only formulas, correcting misconceptions in geometry, increasing student attitudes towards geometry, improving physical and psychological conditions (Akman, 2002; Başışık, 2010).

Affective characteristics are emotional tendencies such as love, interest, commitment, belief, and attitude (Bloom, 1995). The individuals decide their behavior with the effect of their affective characteristics. In this respect, affective characteristics have an important place in education to ensure that the behaviors are at the desired level and the goals are obtained. There are affective features in the curriculum, and besides knowledge and skills, it also includes expressions such as curiosity, attitude, self-confidence and transferring values (MoNE, 2018). While the family affects the individual's affective characteristics such as attitude and belief from birth to school life; factors such as peers, training and the mass media start to be influential from the beginning of school life. Considering that schools that shape the future are the settings where individual spend their most critical periods, it is necessary to improve affective characteristics such as interest, attitude and motivation, which affect the realization of target behaviors.

Schools are educational environments where individuals develop and change cognitively, emotionally and behaviorally. Starting from primary school, the school environment includes critical periods for students, and in this respect, in-school experiences are important in students' psychological development and academic achievement. Students have expectations in their school life such as observing affection between teacher and student, reaching a wide range of opportunities at school, having administrators and teachers as guides, and learning useful information at school (Aydoğdu, 2008; Balcı, 1999; Inbar, 1996; Saban, 2011). Students' attitudes towards geometry and their perceived school experiences direct their feelings and thoughts and thus affect their behavior.

İnceoğlu (1993) defined attitude as the emotional, cognitive and behavioral tendency shaped by an individual's experiences, motivation, environment and knowledge. An attitude is not a direct behavior but indicates a tendency towards specific behaviors. In addition, the attitude is not innate, but occurs as a result of experiences and may continue through a certain process. Attitudes which create bias and partiality are effective in the formation of positive or negative situations in relation to behaviors (Tavşancıl, 2014). Factors such as family, environmental effects, social environment of the individual, mass media, personality traits, education and beliefs are effective in shaping attitudes (Güney, 2000).

Based on the definition of attitude, attitude towards geometry is defined as the emotional, cognitive and behavioral tendencies of the individual regarding the geometry lesson, the geometry teacher, the geometry activities and the use of geometry (Bindak, 2004). Attitudes have functions such as adaptation, provision of benefits, creation of value, identification of personal characteristics and development of behavior (Hogg and Vaughan, 1995). Yenilmez and Özabacı (2003) stated that the factors affecting the attitude towards mathematics, and therefore, geometry are teachers, emotions, self-image and behaviors. Based on these factors, the teacher's professional knowledge and field knowledge, teacher-student relations, positive or negative reactions from the student's circle of friends, and the student's participation in the lesson, fulfilling his duties and responsibilities affect the attitude towards geometry.

Examination of geometry teaching programs in terms of affective features presents several objectives such as acquisition and improvement of attitudes by students (MoNE, 2018). Positive or negative attitudes are formed by comparing two situations (Tavşancıl, 2014). Positive attitudes are towards desired emotions and behaviors, while negative attitudes are towards undesirable emotions and behaviors. When considered in terms of education, while having a fondness for the lesson, motivation towards the lesson and feelings of enjoyment indicate a positive attitude; feelings such as dislike for the lesson or feelings of boredom during the lesson indicate a negative attitude. Cockcroft (1982) reported that positive attitudes facilitate learning while negative attitudes inhibit learning. Negative attitudes may also cause students to be closed to learning because they continue for a period of time.

Technology has become a vital need today so much so that some processes cannot even be performed without technological tools and newly developed methods. The use of technology in the classroom has become an important requirement at schools since schools are expected to facilitate daily life and be up-to-date within the bounds of the needs of the era. The literature review points to studies in which technology-supported learning contributes to the formation of positive attitudes (Göksu, 2020; Orçanlı, 2015; Önal and Demir, 2012; Sarıaslan and Küçük Demir, 2019, Topraklıoğlu, 2019). With its positive effect on attitudes, technology use in the teaching environment also contributes to the development of educational environments and the creation of desired behaviors.

School is an educational environment where information, necessary skills and habits are taught to individuals in line with the objectives and within the framework of a certain program. Schools are places where the individual's feelings and thoughts are

shaped in addition to the family training, and where the individual receives education in line with selected objectives from a young age. The fact that many factors affecting attitudes, such as peer circle, education, teacher and school environment are included in the school environment shows that schools are an important area of emotional and psychological development (Güney, 2000). In addition, the fact that the critical periods which are the most emotionally intense periods for the students are experienced within the school age show that the school environment is an important structure.

Experiences are defined as things that remain with the person after what is heard or seen (TDK, 2011). School experiences, on the other hand, can be defined as the things that remain in the students after what they experience, see and hear at school. Practices and experiences shape attitudes (Tavşancıl, 2014). On the other hand, since attitudes direct behaviors, identification, regulation and development of school experiences contribute to the formation of desired behaviors.

Students with positive school experiences fulfill their course and homework responsibilities. Positive school experiences improve the school and classroom environment, relieve students psychologically and increase students' academic achievement (Baytemir et al., 2015; Güler, 2019; Ma, 2007). In addition to cognitive levels, affective levels and experiences should be examined at schools which are among the environments most affected by the changing conditions (Anderson-Butcher et al., 2012). This examination will help determine the factors that affect experiences and therefore behaviors so that measures can be taken and the aspects of school environments that need to be improved can be identified.

School experiences include the elements such as teachers, students, staff, administrators and the environment where the school is located. In addition, school experiences also incorporate activities that focus on academic monitoring such as feedback provided by teachers and administrators, monitoring student learning, and involving students in decision making as well as emotions and motivations towards school work and school and the sense of belonging to school and peers (Anderson-Butcher et al., 2012). Libbey (2004) stated that school connectedness is the way students perceive school relations. Studies showed that the students' academic achievement increased when their school commitment was high (Finn, 1993). Middleton and Midgley (2002) stated that academic monitoring has a shaping effect on students' self-efficacy beliefs and academic beliefs. Academic motivation, defined as energy towards academic goals, was found to reduce anxiety and increase achievement (Bozanoğlu, 2004; Gottfield, 1990).

There are studies examining the effect of material use on attitude in the framework of the research on attitudes towards geometry (Yemen, 2009; Budak, 2010; Önal and Demir, 2012; Şeker, 2014; Orçanlı, 2015; Sarıaslan and Küçük Demir, 2019; Topraklıoğlu, 2019; Özmen, 2019 ; Göksu, 2020; Frazier, 2020) and studies on determining the attitude towards geometry and whether it differed in terms of demographic characteristics (Bulut et al., 2002; Bindak, 2004; Aktaş and Aktaş, 2012; Mahanta, 2012; Hızlı, 2013; Sunzuma, Masocha and Zezekwa, 2013; Avcı et al., 2014; Melo and Martins, 2015; Kaba Daymaz and Boğazlıyan, 2016; Bora and Ahmed, 2018; Özdişçi, 2019; Ylano and Tayaben, 2019; Auliya and Munasiah, 2020; Bulut et al., 2020;Sevgi and Gürtaş, 2020; İlhan, Gemcioğlu and Poçan, 2021; Yücel and Koç, 2021) while studies on perceived school experiences usually centered on metaphor studies on school life (Aydoğdu, 2008; Özdemir and Yüner, 2017; Arslan, 2020), on factors such as academic motivation and commitment to school (Finn, 1993; Arastam, 2009; Middleton and Midgley, 2002; Bozanoglu, 2004; Dogan, 2014; Fan and Williams, 2018) and on perceived school experiences in terms of demographic characteristics (Güler, 2019). Based on the relevant literature review, no research was found on the relationship between middle school students' attitudes towards geometry and their perceived school experiences. The research is believed to be distinctive in this respect.

This research aimed to examine the relationship between 5$^{th}$, 6$^{th}$, 7$^{th}$ and 8$^{th}$ grade middle school students' perceived school experiences and their attitudes towards geometry in the Southeastern Anatolia Region. In addition, the sub-objectives in this study included the examination of whether the variables of gender, school type, grade level, age, parent education status and mathematics achievement score created a significant difference on students' perceived school experiences and attitudes towards geometry.

In line with these purposes, answers were sought to the following problems;

1. What is the students' attitude towards geometry?

2. Do the students' attitudes towards geometry show a statistically significant difference regarding gender, school type and mathematics achievement scores?

3. What is students' perceived school experiences?

4. Does the students' perceived school experiences show a statistically significant difference regarding gender, school type and mathematics achievement scores?

5. Is there a significant relationship between students' attitudes towards geometry and their perceived school experiences?

6. Do students' perceived school experiences significantly predict their attitudes towards geometry?

## METHOD/MATERIALS

### Research Model/Design

The research was carried out with the relational survey model to examine the relations between the attitudes and perceived school experiences of middle school students in the Southeastern Anatolia Region and to explore the relationship of these concepts with the identified variables.

## Study Group/Universe and Sample

The universe of the study consisted of 975043 middle school students studying in the Southeastern Anatolia Region in the 2021-2022 academic year. The proportional cluster sampling method, one of the random sampling methods, was used to determine the distribution to the provinces in the study. The required sample for the study was calculated as 600 by sampling from the population based on accessibility, cost effectiveness and time saving. The simple random sampling method was used to select the schools to be included in the research sample.

Table 1 presents the distribution of the information regarding students' gender, school type and mathematics achievement in the study.

***Tablo 1:The demographic characteristics of the students***

| Variable | Sub Groups | Frequency (N) | % |
|---|---|---|---|
| **Gender** | **Female** | 317 | 52,2 |
| | **Male** | 290 | 47,8 |
| **School Type** | **Middle School** | 465 | 76,6 |
| | **Imam Hatip Middle School** | 142 | 23,4 |
| **Mathematics Achievement Score** | **0-49,99** | 172 | 28,3 |
| | **50-59,99** | 163 | 26,9 |
| | **60-69,99** | 103 | 17,0 |
| | **70-84,99** | 79 | 13,0 |
| | **80-100** | 90 | 14,8 |
| **Total** | | 607 | 100 |

Table 1 shows that 52.2% of the study participants were male and 47.8% were female. According to Table 1, 317 female students and 290 male students participated in the research. The majority (76.6%) of the students participating in the research attended Basic Education Middle Schools. Examination of the frequency information of student distribution in the study by mathematics achievement score showed that 55.2% of the students scored below 60. It was found that the participation of students with low achievement levels was high.

## Data Collection Tools

Data were collected in this study which aimed to present the relationship between middle school students' perceived school experiences and attitudes towards geometry with the help of "Personal Information Form", "Scale of Attitudes towards Geometry" and "Perceived School Experiences Scale". Scale of Attitudes towards Geometry, a five-point Likert-type scale with 24 items, was developed by Özdişçi and Katrancı (2019) to determine middle school students' attitudes towards geometry. The scale consists of three factors: "Positive attitudes", "Negative attitudes" and "Technology". Özdişçi and Katrancı (2019) declared the Cronbach alpha internal consistency of the entire scale to be 0.886. The "positive" (1, 3, 6, 8, 11, 14, 16, 18, 20), "negative" (5, 9, 12, 22, 24) and "technology" (2, 4, 7, 10). , 13, 15, 17, 19, 21, 23) sub-factors of the scale were calculated as 0.924, 0.728 and 0.909, respectively. Özdişçi and Katrancı (2019) concluded that the scale is valid and reliable.

Confirmatory Factor Analysis and Cronbach's Alpha coefficient were recalculated to determine whether the scale was a valid and reliable scale for this study. As a result of the validity analysis, the *t* values were found to be significant (t> 2.56, p>0.01) and fit intervals and validity coefficients showed that the scale was valid (r>0.30). When the Cronbach Alpha internal consistency was examined, the internal consistency coefficient of the attitude scale towards geometry was found to be 0.790 and the internal consistency coefficients of the sub-dimensions "positive attitude", "negative attitude" and "technology" were calculated as 0.832, 0.600 and 0.795, respectively. As a result, it was concluded that the " Scale of Attitude towards Geometry" was a valid and reliable scale for this study.

Perceived School Experiences Scale, a five-point Likert-type scale with 14 items, was developed by Anderson-Butcher et al. (2012) to determine students' perceived school experiences and was adapted to Turkish by Baytemir et al. (2015). Cronbach's alpha reliability coefficient for the whole scale was found to be 0.93. The scale consists of three sub-dimensions as "Academic Press" (1., 2., 3. and 4. items), "Academic Motivation" (5., 6., 7., 8., 9. and 10. items) and "School Connectedness" ( 11., 12., 13., and 14. items). Cronbach's alpha reliability coefficients for the sub-dimensions of the scale were 0.85 for Academic Press, 0.83 for Academic Motivation and 0.85 for School School Connectedness.

The validity and reliability of the Perceived School Experience Scale was retested for this study with Confirmatory Factor Analysis and via calculation of Cronbach's Alpha coefficient. As a result of the validity analysis, the *t* values were found to be significant (t> 2.56, p>0.01) while fit intervals and validity coefficients showed that the scale was valid (r>0.30). When the Cronbach Alpha internal consistency was examined, the internal consistency coefficient of the perceived school experience scale was found to be 0.84, and the internal consistency coefficients of the sub-dimensions "academic press", "academic motivation" and "school

connectedness" were 0.693, 0.653 and 0.75, respectively. As a result of the findings, it was concluded that the "Perceived School Experiences Scale" was a valid and reliable scale for this research.

### Data Collection and Analysis

The data obtained from the scales applied to the required sample were coded and entered into the SPSS 22 package program. Negative items were coded in reverse. Descriptive statistics were used in the analysis of the data collected in the scales. Normality tests were carried out in the research to determine the suitable analysis method to be used in statistical analysis. Normality tests were analyzed and "parametric" or "non-parametric" tests were utilized as suitable analysis methods based on the normality of the distribution. Normality interpretation was done with the help of skewness and kurtosis values obtained from normality tests. Table 2 presents the statistical central tendency and distribution measures, skewness and kurtosis values of the scales and their sub-dimensions as used in the study.

**Tablo 2: Descriptive statistics on scales**

| Variable | N | Min | Max | x̄ | Ss | Variance | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| **PSES** | 607 | 1,29 | 5,00 | 3,76 | ,76 | ,58 | -,854 | ,250 |
| Academic Press | 607 | 1,00 | 5,00 | 3,94 | ,93 | ,87 | -,969 | ,295 |
| Academic Motivation | 607 | 1,17 | 5,00 | 3,57 | ,82 | ,68 | -,453 | -,435 |
| School Connectedness | 607 | 1,00 | 5,00 | 3,87 | 1,0 | 1,04 | -,777 | -,316 |
| **ATG** | 607 | 1,21 | 4,79 | 3,35 | ,52 | ,28 | -,168 | ,014 |
| Positive Attitude | 607 | 1,00 | 5,00 | 3,28 | ,80 | ,65 | -,367 | -,142 |
| Negative Attitude | 607 | 1,00 | 5,00 | 3,42 | ,82 | ,67 | -,254 | -,431 |
| Technology | 607 | 1,30 | 5,00 | 3,38 | ,76 | ,58 | -,185 | -,294 |

As Table 2 shows, the skewness values of the scales and their sub-dimensions took values between --0,168/-0,969 in the normality test while the kurtosis values were between --0,435/+0,295. According to Tabachnick and Fidell (2013), the skewness and kurtosis values of the data between -1.5 and +1.5 indicate that normality is provided and the scores of the data are normally distributed. In order to analyze whether there was a statistically significant difference between the variables in the research sub-problems, "*t*-test" was used for the variables with two subgroups and "One-Way Analysis of Variance" was used for the variables with three or more subgroups. Multiple comparison analyzes were used based on ANOVA results to identify the source of the difference between the groups when there was a significant difference. In the Post Hoc tests, the Sheffe test was used to determine the source of the significant difference between the groups. The Dunnett C test was used in the cases where the group variances regarding the distribution of scores were not equal. Correlation coefficients were calculated with the Pearson Correlation test in order to determine the relationship between the Attitudes towards Geometry and the Perceived School Experiences. In addition, "Multiple Regression Analysis" was carried out to determine how the specific independent variables affected the dependent variable.

The assumptions required for the multiple regression analysis were checked. A linear relationship was found between the variables with the help of graphics and since the correlation between the variables was less than 0.80, it was concluded that there was no problem of multicollinearity (Berry et al., 1985). In addition, while checking the multicollinearity assumption, VIF values were determined to be less than 2,5 (1,53; 1,76; 1,62) and Cook's Distance values were found to be less than 1,00 for the extreme value assumption (0,061), therefore the assumptions were met (Allison, 1999; Cook et al, 1982). The histogram graph was examined to control the normality assumption of the dependent variable, and the curve of the graph was determined to have a normal slope. In addition, the Durbin Watson value was calculated to control the assumption that the errors were independent from each other and this value was determined to be 1,80. Since the calculated value was between 1 and 3, it was concluded that the assumption was met (Field, 2009). Hence, necessary assumptions for analysis were found to be provided.

## FINDINGS

The study presents the findings under the following headings: the findings regarding the examination of the relationship between middle school students' attitudes towards geometry and their perceived school experiences and the findings about whether this relationship differed according to demographic variables. In addition, findings are presented regarding the predictive power of perceived school experiences on attitudes towards geometry.

### Findings Related to Middle School Students' Attitudes towards Geometry and Their Perceived School Experiences

Table 3 presents the mean scores for the Scale of Attitudes towards Geometry and the Perceived School Experiences Scale.

**Tablo 3:Mean scores for the attitude scale towards geometry and the scale of perceived school experiences**

| Scale | N | x̄ | Ss |
|---|---|---|---|
| **Scale of Attitudes Towards Geometry** | 607 | 3,35 | 0,52 |

| | | | | |
|---|---|---|---|---|
| Sub Dimensions | Positive Attitude (ATG) | 607 | 3,28 | 0,80 |
| | Negative Attitude (ATG) | 607 | 3,42 | 0,82 |
| | Technology (ATG) | 607 | 3,38 | 0,76 |
| **Perceived School Experiences Scale** | | 607 | 3,76 | 0,76 |
| Sub Dimensions | Academic Press (PSES) | 607 | 3,94 | 0,93 |
| | Academic Motivation (PSES) | 607 | 3,57 | 0,82 |
| | School Connectedness (PSES) | 607 | 3,87 | 1,02 |

As Table 3 shows, the mean score for the whole Scale of Attitudes towards Geometry was calculated as x̄=3,35. Based on the findings, it was found that middle school students' attitudes towards geometry were at the "moderate" level. The mean score the whole Perceived School Experiences Scale was calculated as x̄=3,76 and it was concluded that the positive school experiences perceived by the secondary school students were at a “high” level.

## Examining the Attitudes towards Geometry in Terms of Variables

Table 4 presents the results of the *t*-test, conducted to determine whether middle school students’ attitudes of towards geometry differed by gender.

**Tablo 4: t-test results of students' Attitudes towards Geometry by gender**

| Variable | Gender | N | x̄ | Ss | Sd | t | p |
|---|---|---|---|---|---|---|---|
| **Scale of Attitudes Towards Geometry** | **Female** | 317 | 3,34 | ,54 | 605 | -,402 | ,688 |
| | **Male** | 290 | 3,36 | ,51 | | | |
| **Positive Attitude** | **Female** | 317 | 3,31 | ,82 | 605 | 1,180 | ,238 |
| | **Male** | 290 | 3,24 | ,79 | | | |
| **Negative Attitude** | **Female** | 317 | 3,42 | ,83 | 605 | ,088 | ,930 |
| | **Male** | 290 | 3,42 | ,80 | | | |
| **Technology** | **Female** | 317 | 3,33 | ,79 | 605 | -1,844 | ,065 |
| | **Male** | 290 | 3,44 | ,72 | | | |

According to Table 4, students' positive and negative attitudes towards geometry and their attitudes towards technology did not differ significantly by gender, ( $t_{(Positive\ Attitude)}$= 1,180, p>.05; $t_{(Negative\ Attitude)}$=0,088,*p>.05*; t ($_{(Technology)}$= -1,844, *p>.05* ). Students' attitudes towards geometry did not differ statistically according to gender ($t_{(Attitude\ Towards\ Geometry)}$=-0,402, *p>.05* ). Based on these results, female and male students' attitudes towards geometry and sub-dimensions of attitudes such as positive attitudes, negative attitudes and views towards technology were similar to each other.

Table 5 displays the results of the *t*-test conducted to determine whether middle school students’ attitudes towards geometry differed by school type.

**Table 5: *t*-test results of students' Attitudes towards Geometry by school type**

| Variable | School Type | N | x̄ | Ss | Sd | t | p |
|---|---|---|---|---|---|---|---|
| **ATG** | **Middle School** | 465 | 3,36 | ,51 | 212 | ,651 | ,516 |
| | **İmam Hatip Middle School** | 142 | 3,32 | ,58 | | | |
| **Positive Attitude** | **Middle School** | 465 | 3,29 | ,78 | 605 | ,839 | ,402 |
| | **İmam Hatip Middle School** | 142 | 3,23 | ,87 | | | |
| **Negative Attitude** | **Middle School** | 465 | 3,41 | ,82 | 605 | -,364 | ,716 |
| | **İmam Hatip Middle School** | 142 | 3,44 | ,80 | | | |
| **Technology** | **Middle School** | 465 | 3,39 | ,74 | 605 | ,094 | ,578 |
| | **İmam Hatip Middle School** | 142 | 3,35 | ,82 | | | |

Examination of the analysis results in Table 4 shows that students’ ositive and negative attitudes towards geometry and their attitudes towards technology did not differ significantly by school type ($t_{(Positive\ Attitude)}$= 0,839, *p>.05*; $t_{(Negative\ Attitude)}$=-0,364, *p >.05,* $t_{(Technology)}$=0,094, *p>.05*). In addition, students' attitudes towards geometry did not differ statistically according to school type ($t_{(Attitude\ towards\ geometry)}$=-0,651, *p>.05*). Based on these results, students' attitudes towards geometry and sub-dimensions of attitudes such as positive attitudes, negative attitudes and views towards technology were similar to each other whether they attended Basic Education Middle Schools or Imam Hatip Middle Schools.

Table 6 provides the results of ANOVA which was conducted to determine whether middle school students’ attitudes towards geometry differed by their mathematics achievement score.

**Table 6: ANOVA results regarding students' Attitudes towards Geometry by achievement score**

| | Achievement Level | N | x̄ | Ss | Sd | F | p | Significant Difference |
|---|---|---|---|---|---|---|---|---|
| **Attitudes towards Geometry** | 0-49,99 | 172 | 3,28 | ,54 | 4-602 | 3,239 | ,012* | 80-100 >0-49,99 |
| | 50-59,99 | 163 | 3,31 | ,48 | | | | |
| | 60-69,99 | 103 | 3,35 | ,48 | | | | |
| | 70-84,99 | 79 | 3,43 | ,52 | | | | |
| | 80-100 | 90 | 3,50 | ,58 | | | | |
| | Toplam | 607 | 3,35 | ,52 | | | | |
| **Positive Attitude** | 0-49,99 | 172 | 3,21 | ,86 | 4-602 | ,749 | ,559 | |
| | 50-59,99 | 163 | 3,26 | ,76 | | | | |
| | 60-69,99 | 103 | 3,32 | ,78 | | | | |
| | 70-84,99 | 79 | 3,28 | ,85 | | | | |
| | 80-100 | 90 | 3,39 | ,77 | | | | |
| | Toplam | 607 | 3,28 | ,80 | | | | |
| **Negative Attitude** | 0-49,99 | 172 | 3,35 | ,78 | 4-602 | 4,803 | ,001* | 80-100 >0-49,99<br>80-100 > 50-59,99 |
| | 50-59,99 | 163 | 3,28 | ,84 | | | | |
| | 60-69,99 | 103 | 3,45 | ,81 | | | | |
| | 70-84,99 | 79 | 3,47 | ,76 | | | | |
| | 80-100 | 90 | 3,72 | ,84 | | | | |
| | Toplam | 607 | 3,42 | ,82 | | | | |
| **Technology** | 0-49,99 | 172 | 3,30 | ,72 | 4-602 | 1,920 | ,106 | |
| | 50-59,99 | 163 | 3,37 | ,76 | | | | |
| | 60-69,99 | 103 | 3,33 | ,72 | | | | |
| | 70-84,99 | 79 | 3,55 | ,76 | | | | |
| | 80-100 | 90 | 3,48 | ,85 | | | | |
| | Toplam | 607 | 3,38 | ,76 | | | | |

**p<,05*

According to Table 6, there was a statistically significant difference in participating students' mean attitude scores towards geometry in regards to the achievement variable ($F_{(4\text{-}602)\text{Attitude towards Geomerty}}$= 3,239, p<.05 ). Then, the groups with a significant difference were examined. In comparing the attitudes towards geometry by achievement groups, significant differences were observed between 0-49,99 and 80-100 achievement groups based on the Sheffe test. The groups with higher or lower attitudes towards geometry were identified by examining the arithmetic means of these achievement groups. The arithmetic mean of the attitude towards geometry in the 0-49,99 achievement group was (x̄= 3,28); and the arithmetic mean of the attitude towards geometry in the 80-100 achievement group was (x̄= 3,50). The attitudes towards geometry for the students with 80-100 achievement scores were found to be higher than the attitudes of the students with 0-49.99 achievement scores.

When Table 6 was examined, a statistically significant difference was observed in the sub-dimension "negative attitude" based on the achievement variable ($F_{(4\text{-}602)\text{ Attitude towards Geomerty}}$ = 3,239, *p<,05*; $F_{(4\text{-}602)\text{Negative Attitude}}$=4,803; *p<,05*).Examination of "Positive Attitude" and "Technology" sub-dimensions showed no significant difference between students' meaan scores in the "positive attitude" and "technology" sub-dimensions based on the achievement variable ($F_{(4\text{-}602)\text{Positive Attitude}}$=0.749, p>.05; $F_{(4\text{-}602)\text{Technology}}$=1,920, *p>.05* ).

The arithmetic mean of the attitude towards geometry was (x̄= 3,35) in the 0-49,99 achievement group; it was (x̄= 3,28) in the 50-59,99 achievement group and it was (x̄= 3.72) in the 80-100 achievement group. Examination of the obtained means showed that the attitudes of the groups with 80-100 achievement scores were more negative compared to the attitudes of the students with 0-49,99 and 50-59,99 achievement scores.

## Examination of Perceived School Experiences in Terms of Variables

Table 7 presents the results of the *t*-test conducted to determine whether middle school students' perceived school experiences differed by gender.

**Table 7: *t*-test results of students' Perceived School Experiences by gender**

| | Gender | N | x̄ | Ss | Sd | t | p |
|---|---|---|---|---|---|---|---|
| **PSES** | Female | 317 | 3,83 | ,77 | 605 | 2,51 | ,012* |
| | Male | 290 | 3,68 | ,74 | | | |
| **Academic Press** | Female | 317 | 3,98 | ,94 | 605 | 1,30 | ,194 |
| | Male | 290 | 3,88 | ,92 | | | |
| **Academic Motivation** | Female | 317 | 3,63 | ,83 | 605 | 1,95 | ,051 |
| | Male | 290 | 3,50 | ,81 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **School Connectedness** | Female | 317 | 3,98 | 1,00 | 605 | 3,00 | ,003* |
| | Male | 290 | 3,74 | 1,03 | | | |

**p<,05*

According to Table 7, it was concluded that there was no statistically significant difference by gender in the scores of "academic press" and "academic motivation", the sub-dimensions of Perceived School Experience Scale ($t_{(Academic\ Press)}$; 1,30, *p>,05*; $t_{(Academic\ Motivation)}$=1,95, *p>,05*). A significant difference was found by gender in the sub-dimension of students' perceived school experiences and "school connectedness" ($t_{(Perceived\ School\ Experiences)}$; 2,51, *p<,05*; $t_{(school\ connectedness)}$=3,00, *p<,05*). It was concluded that female students' mean perceived school experiences and mean school connectedness (x̄=3,83), were higher than thhose of the male students' (x̄=3,68). Perceived school experiences and school connectedness dimensions were found to be more positive and higher in female students compared to male students.

Table 8 presents the results of the *t*-test conducted to determine whether middle school students' perceived school experiences differed by school type.

**Table 8: *t*-test results of students' Perceived School Experiences by school type**

| | | N | x̄ | Ss | sd | t | p |
|---|---|---|---|---|---|---|---|
| **PSES** | **Middle School** | 465 | 3,74 | ,77 | 605 | -,957 | ,339 |
| | **İmam Hatip Middle School** | 142 | 3,81 | ,74 | | | |
| **Academic Press** | **Middle School** | 465 | 3,96 | ,95 | 605 | 1,029 | ,304 |
| | **İmam Hatip Middle School** | 142 | 3,86 | ,86 | | | |
| **Academic Motivation** | **Middle School** | 465 | 3,54 | ,81 | 605 | -1,707 | ,088 |
| | **İmam Hatip Middle School** | 142 | 3,68 | ,87 | | | |
| **School Connectedness** | **Middle School** | 465 | 3,83 | 1,03 | 605 | -1,376 | ,169 |
| | **İmam Hatip Middle School** | 142 | 3,97 | ,96 | | | |

Based on the analysis results presented in Table 8, it was concluded that there was no statistically significant difference between school types in Perceived School Experience Scale and sub-dimension scores ($t_{(Perceived\ School\ Experiences)}$=-0,957, *p>,05*; $t_{(Academic\ Press)}$= 1,029 , *p>,05*; $t_{(Academic\ Motivation)}$=-1,707, *p>,05*; $t_{(School\ Connectedness)}$=-1,376, *p>,05* ). The perceived school experiences and the sub-dimensions of academic press, academic motivation and school connectedness of middle school students studying in Basic Education Middle Schools and Imam Hatip Middle Schools were found to be similar to each other.

When the analysis results shown in Table 7 were examined, it was concluded that there was no statistically significant difference between Perceived School Experience Scale scores by school type ($t^{(Perceived\ School\ Experiences)}$ = -0,957,*p>,05*). The school experiences perceived by the secondary school students studying in Basic Education Middle Schools and Imam Hatip Middle Schools were found to be similar to each other

Table 9 presents the results of ANOVA conducted to determine whether middle school students' perceived school experiences differed by mathematics achievement score.

**Table 9: ANOVA results of students' Perceived School Experiences by achievement score**

| | Achievement Level | N | x̄ | Ss | Sd | F | p | Significant Difference |
|---|---|---|---|---|---|---|---|---|
| **PSES** | 0-49,99 | 172 | 3,66 | ,79 | 4-602 | 2,769 | ,027* | 60-69>0-49,99 |
| | 50-59,99 | 163 | 3,72 | ,74 | | | | |
| | 60-69,99 | 103 | 3,92 | ,72 | | | | |
| | 70-84,99 | 79 | 3,72 | ,80 | | | | |
| | 80-100 | 90 | 3,89 | ,72 | | | | |
| | Total | 607 | 3,76 | ,76 | | | | |
| **Academic Press** | 0-49,99 | 172 | 3,87 | 1,00 | 4-602 | 1,083 | ,364 | |
| | 50-59,99 | 163 | 3,92 | ,95 | | | | |
| | 60-69,99 | 103 | 4,08 | ,80 | | | | |
| | 70-84,99 | 79 | 3,85 | ,96 | | | | |
| | 80-100 | 90 | 4,00 | ,85 | | | | |
| | Total | 607 | 3,94 | ,93 | | | | |
| **Academic Motivation** | 0-49,99 | 172 | 3,44 | ,88 | 4-602 | 3,600 | ,007* | 60-69,99>0-49,99 |
| | 50-59,99 | 163 | 3,49 | ,77 | | | | 60-69,99>50-59,99 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 60-69,99 | 103 | 3,76 | ,77 | | | | |
| | 70-84,99 | 79 | 3,60 | ,81 | | | | |
| | 80-100 | 90 | 3,72 | ,83 | | | | |
| | Total | 607 | 3,57 | ,82 | | | | |
| **School Connectedness** | 0-49,99 | 172 | 3,76 | 1,03 | 4-602 | 1,659 | ,158 | |
| | 50-59,99 | 163 | 3,85 | 1,01 | | | | |
| | 60-69,99 | 103 | 3,99 | 1,00 | | | | |
| | 70-84,99 | 79 | 3,78 | 1,10 | | | | |
| | 80-100 | 90 | 4,03 | ,95 | | | | |
| | Total | 607 | 3,87 | 1,02 | | | | |

**p<,05*

Based on Table 9, there was a statistically significant difference in participating students' mean perceived school experiences scale scores by the achievement variable ($F_{(4\text{-}602)\text{Perceived School Experiences}}$ = 2,769, *p<,05*). Then, the groups with a significant difference were examined. In comparing the perceived school experiences by achievement sub groups, significant differences were observed between 0-49,99 and 60-69,99 achievement sub groups based on the Dunnett C test. The groups with higher or lower perceived school experiences were identified by examining the arithmetic means of these achievement groups. The arithmetic mean of the perceived school experiences in the 0-49,99 achievement group was x̄= 3,66; and the arithmetic mean of the perceived school experiences in the 60-69,99 achievement group was x̄= 3,92.

The perceived school experiences in the 0-49,99 achievement group were found to be higher than the perceived school experiences of the students in the 60-69,99 achievement group.

Examination of Table 9 demonstrated a statistically significant difference by achievement in the "academic motivation" dimension, one of the sub-dimensions of Perceived School Experiences Scale ($F_{(4\text{-}602)\text{Perceived School Experiences}}$= 2,769, *p<05*; $F_{(4).\ \text{-}602)\ \text{Academic Motivation}}$= 3,600, *p<,05*). When the perceived school experiences mean scores were examined, the mean score of the 60-69,99 achievement group (x̄=3,76) was found to be higher than the mean score of the 40-49,99 achievement group (x̄=3,44) and 50-59,99 achievement group (x̄=3,49). Perceived academic motivation of students in the 60-69,99 achievement interval was more positive than the students in the 40-49,99 and 50-59,99 achievement groups.

Examination of the "Academic Press" and "School Connectedness" sub-dimensions of the Perceived School Experience Scale, showed no significant difference by student achievement ($F_{(4\text{-}602)\text{Academic Press}}$=1,083, *p>,05*; $F_{(4\text{-}602)\ \text{School Connectedness}}$ = 1,659, *p>,05* ).

### The Relationship between Perceived School Experiences and Attitudes towards Geometry

Pearson correlation analysis was performed to determine the relationship between perceived school experiences and attitudes towards geometry and the results are presented in Table 10.

**Table 10: Analysis of pearson correlation coefficient values between Perceived School Experiences and Attitudes towards Geometry**

| | **ATG** | Positive Attitude (GYT) | Negative Attitude (GYT) | Technology (GYT) | **PSES** | Academic Press (PSES) | Academic Motivation (PSES) | School Connectedness (PSES) |
|---|---|---|---|---|---|---|---|---|
| **ATG** | 1 | | | | | | | |
| Positive Attitude (ATG) | ,788** | 1 | | | | | | |
| Negative Attitude (ATG) | ,396** | ,232** | 1 | | | | | |
| Technology (ATG) | ,701** | ,233** | -,100* | 1 | | | | |
| **PSES** | ,316** | ,302** | ,067 | ,203** | 1 | | | |
| Academic Press (PSES) | ,264** | ,254** | ,054 | ,168** | ,793** | 1 | | |
| Academic Motivation (PSES) | ,294** | ,270** | ,066 | ,196** | ,879** | ,550** | 1 | |
| School Connectedness (PSES) | ,231** | ,229** | ,045 | ,142** | ,826** | ,495** | ,585** | 1 |

According to Table 10, there was a positive, significant and moderate relationship between perceived school experiences and attitudes towards geometry ($R_{(,316)}$ ; p<0,01). Perceived school experiences consist of only positive items, and as positively perceived school experiences increase, attitudes towards geometry increase as well. Based on the calculaiton of the coefficient of determination ($r^2$=0.09), it can be concluded that 9% of the total variability in attitudes towards geometry was based on positively perceived school experiences.

Multiple regression analysis was used to analyze whether the perceived school experiences sub-dimensions predicted the attitude towards geometry and the results are presented in Table 11.

**Table 11: Multiple linear regression analysis results on predicting the attitudes towards geometry**

| | B | Standard Error | Beta | T | p | Binary r | Partial R |
|---|---|---|---|---|---|---|---|
| Fixed | 2,519 | ,103 | - | 24,384 | ,000* | - | - |
| Academic Press | ,075 | ,027 | ,133 | 2,775 | ,006* | ,264 | ,112 |
| Academic Motivation | ,120 | ,033 | ,188 | 3,679 | ,000* | ,294 | ,148 |
| School Connectedness | ,029 | ,025 | ,055 | 1,123 | ,262 | ,231 | ,046 |

R= 0,321 $R^2$= 0,103

$F_{(3,603)}$= 23,071 p= ,000*

Table 11 pointed to a significant and moderate relationship between perceived school experiences sub dimensions and students' attitudes towards geometry (R= 0,321; $R^2$= 0,103; p< ,05). 10% of students' attitudes towards geometry were explained by students' perceived school experiences sub-dimensions. According to the standardized regression coefficient (β), "Academic Press" (t= 2,775, *p<,05*) and "Academic Motivation" (t=3,679, *p<,05*) sub dimensions of Perceived School Experiences Scale were significant predictors of students' attitudes towards geometry.

There is a significant and moderate relationship between Perceived school experiencessub dimensions and students' attitudes towards geometry. 10% of the students' attitudes towards geometry are interpreted with the sub-dimensions of the school life perceived by the students. According to the standardized regression coefficient (β), the "Academic Press" and "Academic Motivation" sub-dimensions of Perceived School experiences are significant predictors of students' attitudes towards geometry. The relative order of importance of sub-dimensions was found to be as follows: academic motivation and academic press.

## DISCUSSION

This research, which was conducted with a sample selected from the Southeastern Anatolia Region, was carried out with the aim of determining the relationship between perceived school experiences and attitudes towards geometry. In this regard, it is believed that identifying the relationships between the affective characteristics that guide behaviors can help in increasing achievement in education and acquiring the target behaviors. The fact that a significant, positive and moderate relationship was found in the study between students' attitudes towards geometry and their perceived school experiences showed that the attitude towards geometry will increase with the increase in positively perceived school experiences. 10% of the students' attitudes towards geometry was explained by the sub-dimensions of perceived school experiences. Hence, it was concluded that improving school life will be effective in improving attitudes towards geometry. The conclusion that the regulation of school experiences based on the factors that affect the attitudes towards geometry may improve the attitudes towards geometry will contribute to the literature.

According to the findings, middle school students' attitudes towards geometry were at "moderate" level. While this result of the research was similar to the findings obtaned by Bindak (2004) who conducted a study with middle school students; Özdişçi (2019) found that middle school students' attitudes towards geometry were at a "high" level, and Yücel and Koç (2011) concluded that students had a "good" attitude towards geometry.

When the attitudes towards geometry were examined by gender, no significant difference was observed in the attitude scores of female and male students towards geometry. While Sevgi and Gürtaş (2020) and Yücel and Koç (2011), who worked with of middle school students, also found no significant difference in attitudes according to the gender; İlhan, Gemcioğlu and Poçan (2021) and Kaba, Daymaz and Boğazlıyan (2016) found significant differences by gender. Kaba et al. (2016) found that female students' attitudes towards mathematics were more positive compared to male students' attitudes.

It was concluded that there was no statistically significant difference between the students' attitude scores towards geometryby school type and the geometry attitude scores of the students studying in Basic Education Middle Schools and Imam Hatip Middle Schools were similar. The fact that attitude towards geometry did not differ according to school type; can be explained with similar type of teaching in these school types.

It was concluded that attitudes towards geometry differed significantly in terms of achievement. The attitudes towards geometry were found to be higher for the students with 80-100 achievement scores compared to those of students with 0-49,99 achievement scores. This research result was similar to the finding obtained by Bulut, Ekici, İşeri and Helvacı (2020), Özdişçi (2019) and Yücel and Koç (2011). The finding that the group with the highest achievement score had higher attitude towards geometry compared to the group with the lowest score shows the relationship between achievement and attitude.

According to the research results, middle school students' perceived positive school experiences were found to be "high". Based on the analysis results, a significant difference was found in students' perceived school experience scores by gender. It was determined that female students perceived school experiences more positively and at higher levels compared to male students. Güler (2019), who worked with middle school students, reached a similar conclusion. The fact that female students are more emotionally attached can be interpreted as one of the reasons for the higher perceived school experience among female students.

It was concluded that there was no statistically significant difference in students' Perceived School Experience Scale scores by school type. There was a statistically significant difference in students' Perceived School Experience Scale scores by achievement and the school experiences perceived by the 0-49,99 achievement group was more negative compared to the school experiences perceived by 60-69i99 achievement group.

## CONCLUSION AND RECOMMENDATIONS

Since positive school experiences increase the attitude towards geometry, it is recommended to create positive school experiences and to carry out studies on school experiences to increase the attitude towards the lesson.

School experiences include the education students receive, administrators and teachers, and their connectedness to the school and therefore, increasing student-teacher interaction, involving students in school decisions, guiding students, implementing plans that will make students feel committed and connected to the school increase students' perceived school experiences. With this approach, there will be an increase in student attitudes towards geometry.

Qualitative research is recommended to determine the reasons for the differences between the groups based on attitudes towards geometry scores and perceived school experiences scores as well as demographic variables.

It is recommended to determine the characteristics of the schools with the desired geometry attitudes by comparing the regional studies and the results of this research, to provide interaction between schools, to establish an information network in cooperation with schools and to carry out activities that increase the attitude, positive school experiences, and therefore achievement.

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### Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

### Researchers' Contribution Rate

The study was conducted and reported with equal collaboration of the researchers.

### Details on Ethics Committee Approval

Prior to the collection of research data, ethics committee approval was obtained from Çankırı Karatekin University Ethics Committee with the decision dated 07/02/2022 and numbered 130d0a1491084933. After the decision that the research was ethically appropriate, the research process was started.

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# ANNEXES

## ANNEX -A: PERMISSION TO USE THE ATTITUDE TOWARDS GEOMETRY SCALE

Re: Geometri Tutum Ölçeği Kullanım İzni

SS selda sevim <sevim.selda@gmail.com>
7.12.2021 20:59

Kime: Feyza Uysal

Merhabalar, yüksek lisans tezimde geliştirmiş olduğum "Geometriye Yönelik Tutum Ölçeği" ni araştırmanızda kullanabilirsiniz..
Kolay gelsin..

Selda ÖZDİŞCİ
MEB' da Uzm. Mat. Eğitimcisi
Dokuz Eylül Üniversitesi Doktora Öğrencisi
7 Ara 2021 Sal, saat 20:25 tarihinde Feyza Uysal <feyzauysall@outlook.com> şunu yazdı:

> Merhaba,
>
> Ben Feyza Uysal. Çankırı Karatekin Üniversitesi Eğitim Programları ve Öğretim Yüksek Lisans Tez çalışması aşamasındayım. Geliştirmiş olduğunuz "Ortaokul Düzeyinde Geometriye Yönelik Tutum Ölçeği"ni araştırmamda kullanabilir miyim?
>
> Windows için Posta ile gönderildi

## ANNEX -B: PERMISSION TO USE THE PERCEIVED SCHOOL EXPERIENCES SC

Re: Algılanan Okul Yaşantıları Ölçeği Kullanım İzni

KEMAL BAYTEMİR <kemalbaytemir@hotmail.com>
19:07

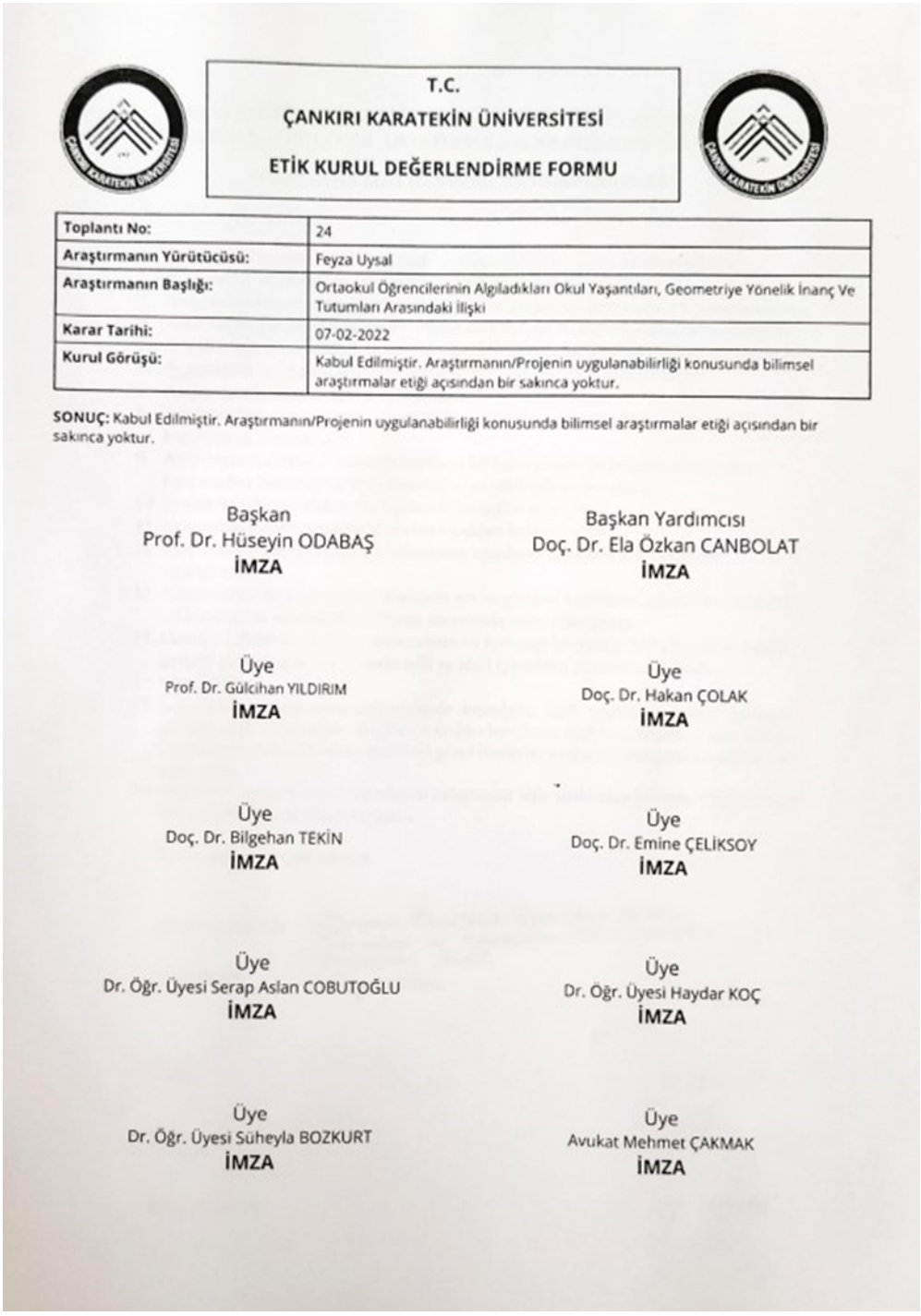
Kime: Feyza Uysal

Merhaba Feyza kullanabilirsin, çalışmalarında kolaylıklar dilerim.

iPhone'umdan gönderildi

> Feyza Uysal <feyzauysall@outlook.com> şunları yazdı (14 Ara 2021 18:15):
>
> Merhaba,
>
> Ben Çankırı Karatekin Üniversitesi Eğitim Programları ve Öğretim Yüksek Lisans tez dönemi öğrencisi Feyza Uysal.
> Türkçe'ye çevirmiş olduğunuz "Algılanan Okul Deneyimleri Ölçeği" ni yüksek lisans tez araştırmamda kullanabilir miyim?
>
> Teşekkürler.
>
> Windows için Posta ile gönderildi

**ANNEX-C: ETHICS COMMITTEE ASSESSMENT FORM**



T.C.
ÇANKIRI KARATEKİN ÜNİVERSİTESİ
ETİK KURUL DEĞERLENDİRME FORMU

| | |
|---|---|
| **Toplantı No:** | 24 |
| **Araştırmanın Yürütücüsü:** | Feyza Uysal |
| **Araştırmanın Başlığı:** | Ortaokul Öğrencilerinin Algıladıkları Okul Yaşantıları, Geometriye Yönelik İnanç Ve Tutumları Arasındaki İlişki |
| **Karar Tarihi:** | 07-02-2022 |
| **Kurul Görüşü:** | Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur. |

**SONUÇ:** Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

Başkan
Prof. Dr. Hüseyin ODABAŞ
**İMZA**

Başkan Yardımcısı
Doç. Dr. Ela Özkan CANBOLAT
**İMZA**

Üye
Prof. Dr. Gülcihan YILDIRIM
**İMZA**

Üye
Doç. Dr. Hakan ÇOLAK
**İMZA**

Üye
Doç. Dr. Bilgehan TEKİN
**İMZA**

Üye
Doç. Dr. Emine ÇELİKSOY
**İMZA**

Üye
Dr. Öğr. Üyesi Serap Aslan COBUTOĞLU
**İMZA**

Üye
Dr. Öğr. Üyesi Haydar KOÇ
**İMZA**

Üye
Dr. Öğr. Üyesi Süheyla BOZKURT
**İMZA**

Üye
Avukat Mehmet ÇAKMAK
**İMZA**

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| Research Article / Araştırma Makalesi |

# The Professional Development of Teachers in Türkiye: First-Year Outputs of the New Approach by the Ministry of National Education

# Türkiye'de Öğretmenlerin Mesleki Gelişimi: Millî Eğitim Bakanlığı Tarafından Geliştirilen Yeni Yaklaşımın İlk Yılı Sonundaki Çıktılar [1]

**Mahmut Özer**[2], **H. Eren Suna**[3]

**Keywords**

1. Teacher characteristics
2. Professional development
3. Ministry of National Education
4. In-service trainings
5. Teacher improvement

**Anahtar Kelimeler**

1. Öğretmen özellikleri
2. Mesleki gelişim
3. Millî Eğitim Bakanlığı
4. Hizmet içi eğitim
5. Öğretmen gelişimi

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## Abstract

*Purpose:* The trainings for teachers' professional development were planned and implemented by the Ministry of National Education (MoNE) for a long time in Türkiye. The MoNE has improved the teachers' professional training system in late 2021 considering the teacher needs, school autonomy and recent research results on effective training policies. This study aims to evaluate the results from the first year of new approach via teacher participation and satisfaction data.

*Design/Methodology/Approach:* The study is design as a casual-comparative research. The teacher population data from the last five years to evaluate the participation and satisfaction within comparative approach. The participation and satisfaction are measured via official participation data and teacher training survey by MoNE.

*Findings:* Results show that the new approach led a great boost in both the total- and individual participation in 2022. The improvement in participation reflected in all ISCED levels. The gender- and seniority distribution have become more balanced. Teachers' satisfaction has maximized in all aspects of trainings in 2022.

*Highlights:* The new approach by MoNE has led a great increase in the participation: almost all teachers in Turkish education system participated the in-service trainings. New approach considering teacher needs and flexibility have a substantial potential for developing the teachers' professional development.

## Öz

*Çalışmanın amacı:* Öğretmen özellikleri, öğrencilerin öğrenme süreci ve eğitim sisteminin kalitesi için kritik önemdedir. Türkiye'de öğretmenlerin mesleki gelişimi gelişim eğitimleri uzun yıllardır Millî Eğitim Bakanlığı (MEB) tarafından planlanmakta ve uygulanmaktadır. MEB, 2021 yılı sonunda mesleki gelişim eğitimleri için yeni bir yaklaşım geliştirmiş, bu yaklaşımda öğretmen ihtiyaçları okul otonomisi ve öğretmen eğitiminde etkinliği artıran politikaları dikkate almıştır. Öğretmen eğitimleri için Öğretmen Bilişim Ağı (ÖBA) adıyla yenilikçi bir platform kurulmuş, eğitim içeriklerinde uygulama becerileri öncelenmiştir. Bu çalışma öğretmen eğitiminde getirilen yeni yaklaşımın ilk yılı sonundaki sonuçlarını öğretmen katılımı ve memnuniyeti verileri aracılığıyla değerlendirmeyi amaçlamaktadır.

*Materyal ve Yöntem:* Bu çalışma nedensel karşılaştırma deseninde tasarlanmıştır. Yeni yaklaşımın oluşturduğu sonuçları değerlendirmek için son beş yılın öğretmen evrenine ait katılım ve memnuniyet verileri kullanılmıştır. Katılım ve memnuniyete yönelik veriler MEB tarafından toplanan resmi katılım kayıtları ve eğitim memnuniyet anketi aracılığıyla toplanmıştır. Çalışmada herhangi bir örnekleme yapılmaksızın öğretmen evreni verileri kullanıldığından istatistiksel anlamlılık testleri uygulanmamıştır.

*Bulgular:* Çalışma bulguları, MEB tarafından geliştirilen yeni yaklaşımın öğretmen eğitimlerine toplam ve tekil katılımda büyük bir artışa yol açtığını göstermektedir. Bu artış tüm International Standard Classification of Education (ISCED) düzeylerinde gerçekleşmiştir. Öğretmenlerin eğitimlere katılımında cinsiyet ve kıdem dağılımı daha dengeli hale gelmiştir. Ayrıca 2022 yılında öğretmenlerin memnuniyet düzeyleri incelenen tüm boyutlarda en üst düzeye ulaşmıştır. Bulgular, öğretmen ihtiyaçlarına odaklanan, okul otonomisini ve eğitim çeşitliliğini artıran bu yeni yaklaşımın öğretmenlerin eğitimlere katılımını ve eğitimden memnuniyetlerini artırmak için büyük bir potansiyele sahip olduğunu göstermektedir.

*Önemli Vurgular:* MEB'in geliştirdiği yeni yaklaşım öğretmen eğitimlerinde katılımı, eğitimlerin kapsayıcılığı ve öğretmen memnuniyetinde büyük bir artış göstermiştir. İlk kez, Türk eğitim sistemindeki neredeyse tüm öğretmenlerin eğitimlere katılımı sağlanmıştır. Eğitimler için okullara özel bütçe ayrılması ve yeni geliştirilen ÖBA platformu hem okul otonomisini hem de eğitimlere katılımı artırmıştır. Çalışma bulguları, öğretmenlerin ihtiyaçlarını dikkate alan ve eğitim politikalarıyla desteklenen yeni yaklaşımın öğretmenlerin mesleki gelişimini daha etkin kılacak potansiyele sahip olduğunu göstermektedir.

[1] Add footnote here.

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## INTRODUCTION

There is consensus among researchers, practitioners, and policymakers that teacher qualifications contribute to educational quality (Blömeke, Olsen & Suhl, 2016; Darling-Hammond, 2000; OECD, 2005; Yoon vd., 2007). The teacher occupies an important position in the classroom and thus determines a variety of educational elements. Considering the individual characteristics and differences of students, they guide the learning process and select appropriate teaching methods.

Professional development and training of teachers are assessed in two contexts: the first is the initial training process (e.g., preservice training or initial teacher training), during which teacher candidates acquire professional skills; and the second is the training they receive during their tenure in the profession (for example, in-service or professional teacher training) (Boeskens, Nusche & Yurita, 2020; OECD, 2019). The initial training of teachers is vital to ensuring that they have adequate skills when they begin their professional careers, but in-service training allows them to enhance their skills and adapt to the changing demands of education (Boeskens, Nusche & Yurita, 2000; OECD, 2019, Reynold, 1999; Yoon et al, 2007). As a result, although initial teacher training is critical to the development of teachers' pedagogical skills, its impact decreases if it is not followed by a well-established in-service training program (Boeskens, Nusche & Yurita, 2000).

As educational norms and teacher expectations have changed over the past few decades (Boeskens, Nusche & Yurita, 2000; OECD, 2009; Reynolds, 1999), in-service trainings have become increasingly important. New technologies in education have created new opportunities for learning and access to information (Guggemos & Seufert, 2021). Students' learning needs are also becoming more complex due to the increased number of national and global migrants, as well as the diversity of students' backgrounds and learning preferences (OECD, 2015). It is imperative that teachers adapt quickly to these new conditions, utilize current educational materials, and integrate technology effectively (Guggemos & Seufert, 2021, OECD, 2015, De la Calle et al., 2021).

Technology advancements and easy access to information have a significant impact on educational transformation (De la Calle, et al., 2021; Winthrop, Williams & McGivney, 2016). Global efforts to provide students with skills rather than information are indicative of this shift. Therefore, teachers must be able to make informed decisions regarding students' learning and assess students' skills using appropriate methods and tools. Recent educational approaches place an emphasis on students' skills and literacy, as well as their ability to use their knowledge in new conditions (European Parliamentary Research Service, 2020).

Similarly to the COVID-19 pandemic, which spread across the globe in 2020, it has also presented new challenges for education systems and students' learning (CEDEFOP, 2020; Istenic, 2021; Özer & Suna, 2020; Özer et al., 2017). As educational processes migrate to virtual environments, teachers are required to possess a wide range of digital and pedagogical competencies (De la Calle et al., 2021; OECD, 2021). In this period, teachers possessing effective digital skills were able to use alternative methods to overcome educational challenges. Since the pandemic, education has become increasingly digital, making it even more critical for teachers to become proficient at using these technologies and to transfer their competencies to digital environments (OECD, 2021).

Professional development training is essential to teachers' adaptation to the aforementioned changes (ILO, 2015; Opfer, 2016). A rapid pace of change in education and the accompanying increased expectations placed on teachers make the characteristics of in-service training activities particularly important. PISA 2015 results indicate that teachers in higher-performing countries participate in more professional development training than their peers in lower-performing countries. In order to maximize educators' adaptation to changing technologies and methods over time, most education systems design in-service training with a lifelong education approach.

There are three steps involved in the professional development of teachers that affect student outcomes (Yoon et al, 2007). The first step of the process is to provide training to teachers in order to improve their knowledge and skills. By revising their knowledge and skills, teachers are able to improve classroom instruction, which in turn enhances students' skills to a higher level (Yoon et al., 2007). Several studies have demonstrated that in-service professional development is most effective when it is practice-oriented rather than theoretical, considers teacher needs, examines the reasons behind students' learning styles and behaviors, is structured as interrelated modules, and occurs in educational institutions (Darling-Hammond, 2017; Desimone, 2009; Kennedy, 2016, 2019; Opfer, 2016). Therefore, effective in-service training systems must prioritize the skills that teachers are able to directly transfer to their classroom processes and to the learning of students. Furthermore, best practices recommend that in-service trainings should be interrelated and conducted throughout the year in educational environments rather than only at certain times of the year.

The professional development of teachers in Türkiye has become systematic and regulated since the 1980s (Aydın, 1987; Baykan, Güngen & Ünal , 1987; Günel & Tanrıverdi, 2014; Ülker, 2009). For many years, professional development trainings were traditionally planned and implemented by the Ministry of National Education (MoNE) (MoNE, 2022; Yazıcı & Gündüz, 2011), using a centralized approach for both planning and implementation to meet the training needs of teachers. As the primary provider of teacher training, MoNE contributed significantly to the development of teachers' skills. There is evidence that Turkish teachers consider these trainings beneficial and find them satisfactory (Ay, 2022; Doan, 2009; Kaleci, 2018; Nemli, 2017; Özer, Suna & Sunar, 2021). It should be noted, however, that this centralized approach has also posed structural difficulties. The first limitation is that teacher training can only be conducted by a limited number of teachers based on the available resources (EARGED, 2006). Since the content of professional development modules is decided centrally, scholars have emphasized that teachers' opinions

should be considered when developing these modules (Arslan, 2015; EARGED, 2006; Gülşen & Yörük, 2021). Additionally, these trainings have the potential to be improved in terms of their quality, including the competence of the trainers, the practicality of the skills emphasized, and the environment in which they are conducted (Arslan, 2015; EARGED, 2006, Aslan Keleş, 2019).

At the end of 2021, the MoNE initiated an important paradigm shift in teacher professional development. This policy change encompassed factors that increase the effectiveness of training, research-based development areas, and feedback from teachers. The new approach represents a significant shift from the conventional centralized approach to a decentralized and school-based approach to teacher training. This redesigned professional development policy takes into account the local needs of each school when determining the training requirements. This is the first time that schools have been allocated a unique budget for teacher training. As a result of this approach, schools will have greater autonomy in identifying and meeting their training needs. Meanwhile, MoNE has developed a new digital platform to improve the efficiency and coverage of online teacher training, the Teacher Informatics Network (BA). The delivery of face-to-face teacher trainings has been transferred from external venues to educational institutions and teacher training centers. Additionally, the new approach emphasizes the importance of practical skills and application of knowledge. In sum, the revised professional development model takes teachers' opinions into consideration when identifying training needs, increases school autonomy and provides financial support for training that supports teachers' practical skills, and repositions schools as teacher training hubs.

The new approach takes important steps toward addressing long-standing issues regarding teacher professional development in Türkiye. As a result of the improvements, multiple dimensions of teacher education have been addressed and solid solutions have been provided for the issues raised in the related studies. The purpose of this study is to evaluate the initial results of the revised teacher training approach in Türkiye through participation data and teacher opinions after the first year of implementation in 2022. Data from the first year of the new approach was compared with previous five-year data on teacher training. Participation rates, individual participation rates, seniority and gender distributions, and teacher satisfaction levels were analyzed and compared.

## Findings from Türkiye on Teacher Professional Development

The purpose of this section is to present the findings of the existing studies on the training and professional development of teachers in Turkiye alongside the best results from the OECDThe Teaching and Learning International Survey (TALIS) cycles. There has been a considerable amount of research that highlights the need for centralized planning and implementation of teachers' in-service trainings in Türkiye (EARGED, 2006). It has been indicated that centralized planning does not adequately consider teachers' opinions on educational needs or the differences between regions in educational needs (Yüner, 2022). As well as motivation loss, teacher trainings are largely compulsory, and feedback is rarely gathered or considered in the planning and implementation of such trainings (Arslan, 2015; EARGED, 2006; Gülşen & Yörük, 2021). Additionally, teachers have expressed a need for greater participation in trainings, as well as clarity regarding the selection of teachers and school administrators for professional development (Aslan Keleş, 2019).

The need for more practical, application-based activities in teacher training has also been highlighted by studies. Educators and school administrators believe that professional development modules tend to emphasize theoretical knowledge rather than practical skills (EARGED, 2006; Aslan Keleş, 2019). According to both Turkish teachers and administrators, practical training enhances classroom performance and student outcomes more effectively than theoretical training (Boeskens, Nusche & Yurita, 2020; Yoon et al., 2007). Finally, previous studies have recommended expanding the range of topics covered in trainings in order to provide teachers with a wider selection of options (EARGED, 2006). Consequently, the revised approach in Türkiye has incorporated social-emotional learning and leadership skills, as well as more traditional and foundational subjects.

The OECD Teaching and Learning International Survey (TALIS) provides information on teacher qualifications and professional development activities across more than 20 countries. Since the TALIS is focusing on professional development in education and presents comparative findings, it is one of the most frequently cited studies on teacher qualifications. Results from the TALIS cycle in Türkiye provide valuable insights into the professional development of teachers in the country.

Turkish teachers participated in only 74.8% of professional development activities over the past year and a half, which is the lowest level among the 23 participating countries (OECD, 2009). Furthermore, the duration of teacher training in Türkiye (14.9 days) was shorter than the TALIS average (17.3). As a result, Türkiye performed lower than the majority of OECD members in terms of participation in professional development and training duration in 2008. Moreover, the results indicate that Turkish teachers are more likely to participate in theoretical professional development activities, such as conferences and seminars, as compared to the TALIS average of 48.9%. However, practice-oriented activities, such as workshops and lectures, are less popular in Türkiye (62.3% in Turkish, TALIS average of 81.2%). Teachers from Türkiye were most commonly cited for low professional development participation because it was difficult to find appropriate training (46.6% in Türkiye, 42.3% on average TALIS), conflicting trainings with work (34.7% in Türkiye, TALIS average 46.8%), or family responsibilities (31.2% in Türkiye, TALIS average 30.1%).

The results of the TALIS 2018 cycle ten years later indicate that the participation rate of Turkish teachers in professional development activities has increased to 93.6%, which remains below the OECD average of 94.5% (OECD, 2019). Table 1 summarizes the results of TALIS 2018.

**Table 1. Participation in Professional Development Trainings in Türkiye —TALIS 2018**

| | Teachers | | | School Administrators | | |
|---|---|---|---|---|---|---|
| | Primary School | Junior-Secondary School | Upper-Secondary School | Primary School | Junior-Secondary School | Upper-Secondary School |
| Türkiye | 95.2 | 93.6 | 92.1 | 95.4 | 96.3 | 94.7 |
| TALIS Average | 95.8 | 93.8 | 94.8 | 97.0 | 98.7 | 98.9 |

| | Primary School | | Upper-Secondary Education | |
|---|---|---|---|---|
| | Women | Men | Women | Men |
| Türkiye | 95.4 | 94.9 | 91.7 | 92.6 |
| TALIS Average | 95.9 | 95.4 | 95.0 | 94.7 |

| | Primary School | | Upper-Secondary Education | |
|---|---|---|---|---|
| | 5 Years or Less | More than 5 Years | 5 Years or Less | More than 5 Years |
| Türkiye | 97.7 | 94.7 | 92.4 | 92.0 |
| TALIS Average | 95.2 | 95.9 | 93.2 | 95.0 |

Table 1 indicates that 95.2% of primary school teachers, 93.6% of junior secondary school teachers, and 92.1% of upper secondary school teachers in Türkiye reported participating in professional training in the past year. The rates are slightly lower than the average for TALIS. Similarly, school administrators in the Turkish sample participated at a rate above 90%, but below the average of TALIS.

In addition, Table 1 indicates that there is virtually no gender gap in the participation in professional development training. At both the primary and secondary levels, the difference in participation rates between men and women is below 1%. As well, the data indicate that less senior teachers participate in professional development trainings in Türkiye slightly more than their more experienced colleagues.

## METHOD/MATERIALS

### Research Design

The study is designed in the form of a descriptive research. Descriptive research allows researchers to describe phenomenon, occurrence, event, that happens in the present (Creswell, 2002). Fraenkel and Wallen (1993) also mentions that descriptive research includes explaining, analyzing, and classifying something in interest through various statistical and data collection methods such as survey, interview, questionnaire, & tests. This involves identification of characteristics of a particular phenomenon through observation, or exploration of correlation between two or more variables (Williams, 2007). This descriptive design is used to investigate how the participation and satisfaction indicators have changed after a comprehensive revision of teacher training approach in Türkiye.

### Data Collection and Analysis

Data which is analyzed in this study is already collected by the Information Technologies (IT) Department and Directorate General for Teacher Training and Professional Development (TTPI) (Official Letter No. E-87446353-622.03-73544294). In this manner, this study analyzed the secondary data on tearchers' participation and satisfaction on teacher trainings. The study considered the total participation (each teacher is considered as the number of his/her participation), the individual participation (each teacher is considered once independent from the number of his/her participation). Based on the TALIS findings indicate that the participation may change based on gender and ISCED levels, the study also involves the change in participation by gender and ISCED levels. The participation and satisfaction data from the last five years (2018 and 2022) were selected to have an appropriate benchmark for interpretation. This approach allows analyzing the changes in participation, satisfaction within subgroups and years. Data on teachers' satisfaction was collected by the IT and TTPI Departments after the completion of teacher trainings through "post-training survey". The common items in survey regarding the face-to-face and online trainings were considered to increase the comparability among years. Research has demonstrated that the survey provided reliable and valid results regarding teachers' opinions in a variety of areas (Özer, Suna & Sunar, 2021). The study do not use any statistical analyses focusing on the significance of means or percentages between the subgroups or years due to the fact that data teacher population data is considered. In this manner, the study do not uses samples as the representative of teacher population. In both the participation

and satisfaction aspects, teacher data is completely anonymized. Thus, researchers analyzed the participation and satisfaction level with demographic and professional variables without any identifying information about teachers.

**Research Population**

The population of the study consists of teachers who participated the professional development trainings (in-service trainings) between 2018 and 2022. From the individual perspective (each teacher is considered once independent from the number of his/her participation), the yearly number of teachers who participated the in-service trainings has varied between 458.641 and 1.006.053 between 2018 and 2022. As mentioned in data collection and analysis section, this study used no sampling method to maximize the advantage of teacher population data.

## FINDINGS

### Participation in Training Programs

Teachers' professional development is greatly influenced by the extent and quality of their training. In order for these trainings to have a significant impact, it is important to determine the number of teachers who benefit from them. For a country with more than 1.2 million teachers, the inclusiveness of trainings is even more imperative. Participants in in-service training were evaluated based on the number of total participants and the number of individual participants. Participants who participated in more than one activity were included in the total number of participants. In order to gain insight into how many teachers attended at least one in-service training, it is necessary to measure individual participation.

Over the past five years, the total number of Turkish teachers who have participated in in-service training is shown in Figure 1.

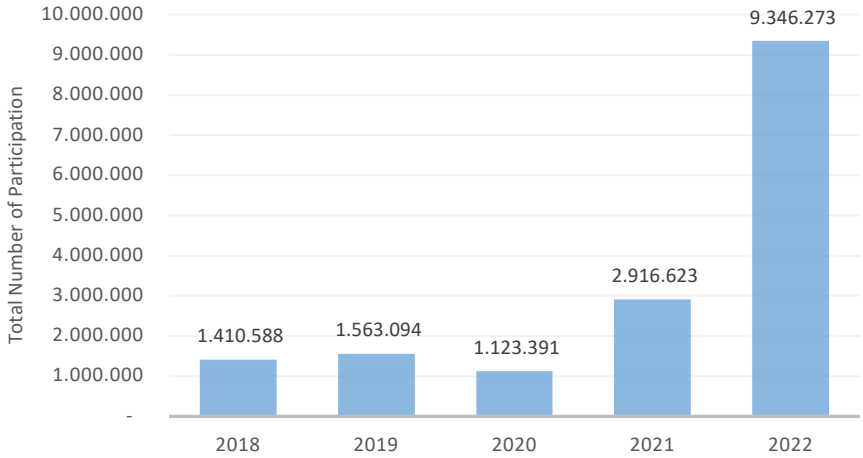



**Figure 1.** Total participation in professional development trainings between 2018 and 2022

As shown in Figure 1, teachers' participation in professional development activities increased significantly between 2018 and 2021, reaching a peak in 2022. Prior to the COVID-19 pandemic, participation ranged between 1.11 million and 1.56 million, before slowing down to 1.12 million in 2020 as a result of limitations caused by the pandemic. Compared to previous years, there was a significant increase in teacher participation in trainings in 2021 due to the return of face-to-face education in schools. Lastly, the new approach significantly accelerated participation, resulting in more than 9 million teacher training participants by 2022. As compared to 2021, the increase is approximately 220%, and compared to 2020, it is 731%. As a result of the new approach, the inclusiveness and coverage of teacher training programs have increased significantly.

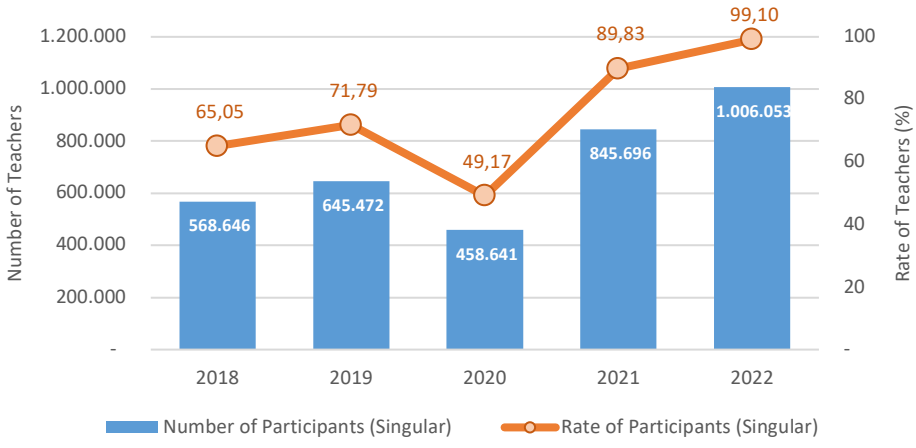


**Figure 2.** The number and rates of individual participation in in-service trainings between 2018 and 2022*

**Teachers working in pre-school, primary education, junior, and upper-secondary education institutions are considered.*

The figure below illustrates the significant increase in the number of individual teachers participating in professional development activities toward 2022. During the period between 2018 and 2020, the percentage of teachers participating in trainings varied between 49% and 72%, but in 2021 it reached 90%. More than one million teachers attended trainings by the end of 2022, which means that almost all teachers in the Turkish education system took part in trainings. Based on the similarity between Figure 1 and Figure 2, it appears that the increase in individual participation reflects the increase in total participation. The results of this study demonstrate a significant increase in the number of teachers participating in teacher training programs, as well as a rise in individual participation.

The figure below illustrates the change in teacher training hours between 2018 and 2022, in terms of the first quarter, first half, and first year.

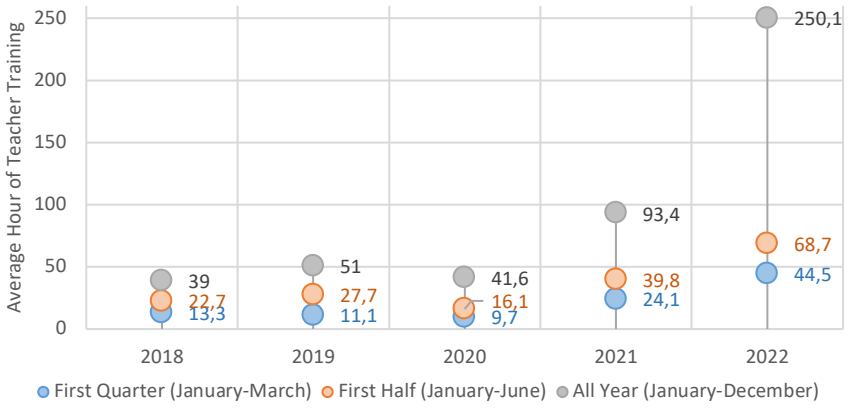



**Figure 3.** Average hours of training per teacher from between 2018 and 2022*

**The average training hour for each month has been calculated cumulatively to cover the trainings received from the beginning of the year until the end of the month*

As shown in Figure 3, the average number of hours of education per teacher began increasing after 2020, reaching its peak (69 hours) in 2022. Training hours, which were comparatively close in 2018 and 2019 (22.7 hours in 2018, 27.7 hours in 2019), decreased significantly in 2020 (16.1 hours) due to pandemic restrictions. Teacher training, which increased significantly in 2021, reached its highest level in 2022. As compared to previous years, the data indicates significant increases, especially during the second half of the year (from July to December) 2022. The average number of hours of training per teacher in 2022 has increased by nearly twofold compared to 2021 (93.4 hours in 2021; 250.1 hours in 2022) and by fivefold compared to 2020 (41.6 hours in 2020; 250.1 hours in 2022). As a result of these findings, teachers received longer periods of training as well as a substantial increase in total participation.

Based on ISCED levels, Figure 4 illustrates the changes in participation rates in Türkiye over the past five years.

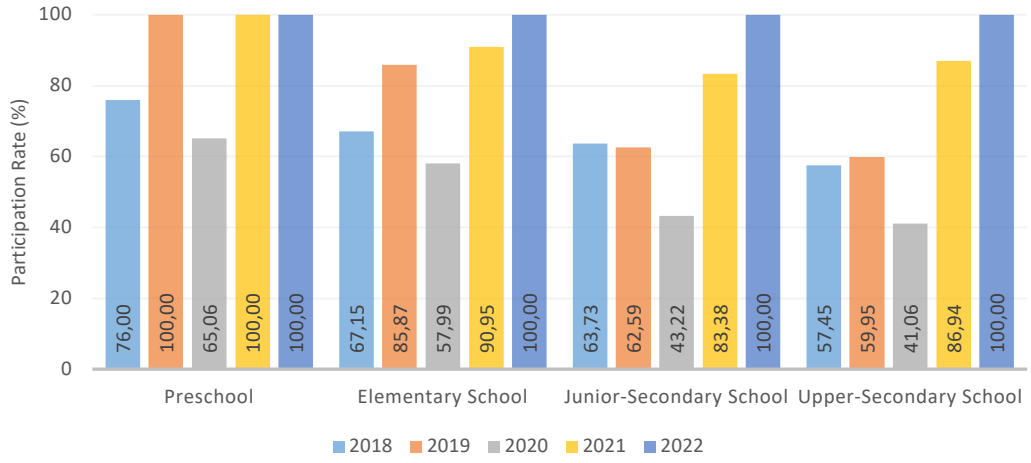



**Figure 4.** The participation rates of different levels of education between 2018 and 2022—ISCED levels*

**Teachers working in pre-school, primary education, junior-, and upper-secondary education institutions are considered*

Figure 4 illustrates the significant increase in participation among teachers from all education levels since 2021, which peaked in 2022. On the other hand, the participation rates from 2020 indicate a negative impact of the pandemic across all levels of education. Furthermore, it indicates that participation at the pre-school and elementary levels increased in 2018 and 2019. Over the course of these years, participation rates consistently decreased from pre-school to upper secondary education. This resulted in a greater level of participation by junior and upper secondary teachers in the new approach to teacher professional development. By 2022, Türkiye's teacher participation rates in professional development trainings exceeded the TALIS averages.

Over the past five years, Figure 5 provides information on the distribution of women who have participated in in-service training.

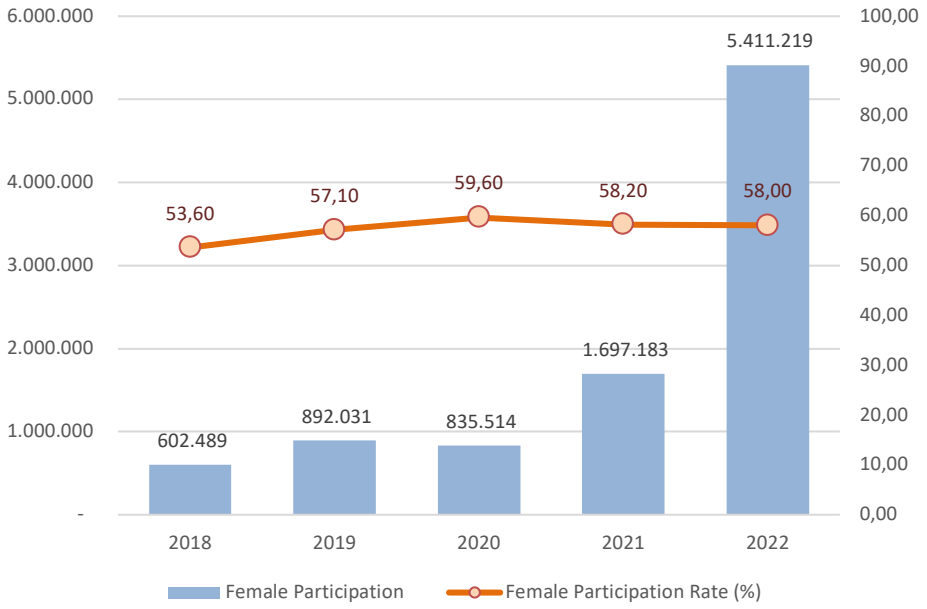
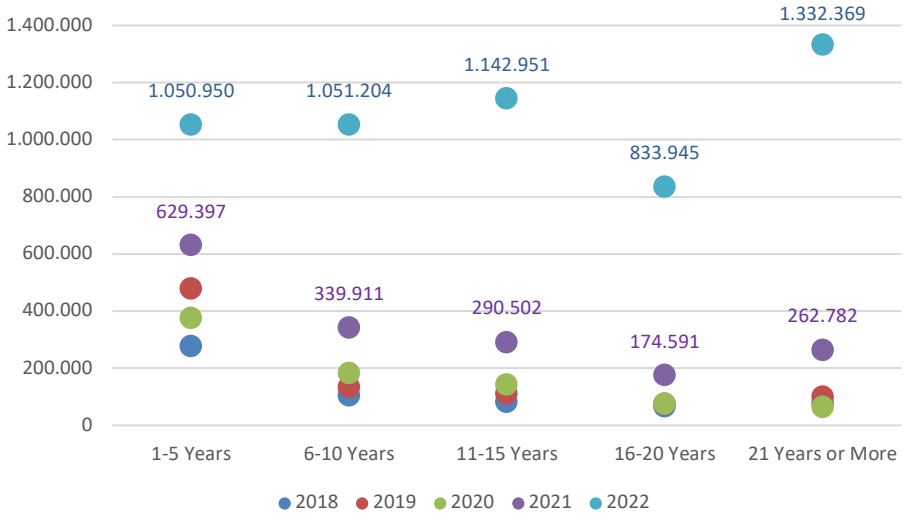



**Figure 5.** The Participation of Women In-Service Training Participants between 2018 and 2022

According to Figure 5, teacher participation in professional development in-service training differs significantly by gender. As approximately 60% of current teachers in Türkiye are women, it is important to measure and monitor this ratio across in-service trainings. It is important that a greater proportion of women are represented in teacher training in this context. Figure 5 shows that even though the number of women participating increased from almost 602 thousand to 5.4 million (reaching almost tenfold) in just five years, the higher rate of participation of women remains unchanged. As a result, new approaches lead to a greater level of inclusivity and reflect the gender distribution of teacher populations in Türkiye.

In Figure 6, the gender distribution of teachers who completed in-service training between 2018 and 2022 is shown.

*a. Number of participation by women in-service trainings by seniority (total participation approach)*



*b. Rate of participation by women in-service trainings by seniority (%)-(total participation approach)*

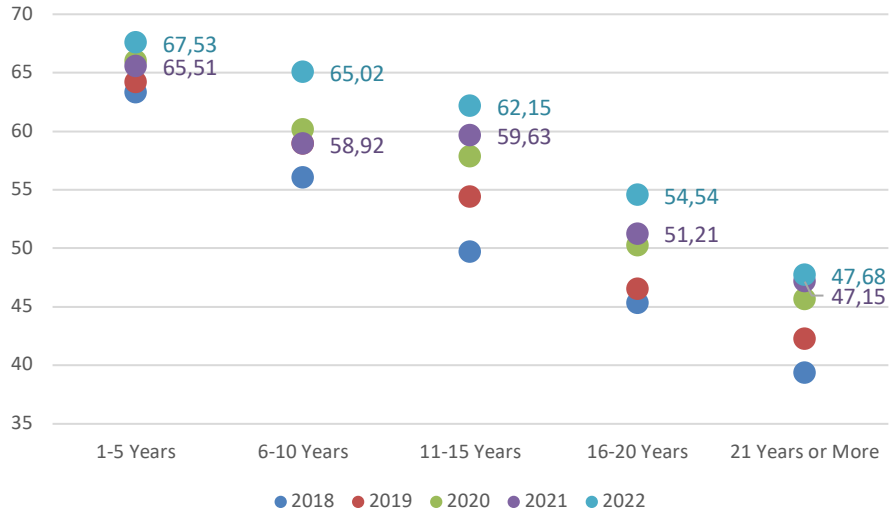



**Figure 6.** Participation of Women in Teacher Trainings by Seniority Group between 2018 and 2022

As shown in Figure 6, there was an increase in women's participation in all seniority groups in both the frequency and rates. Although the training participation rate of women is higher among cohorts that are relatively new to the teaching profession, it decreases as seniority increases. However, the share of participation by women peaked at all seniority groups. The participation has increased between nearly twofold (within the first five years) and six fold (within the first 21 years or more) compared to 2021. Women teachers' seniority distribution has become more balanced in 2022. In particular, the percentage of teachers with more than 11 years of experience has increased significantly. This is also critical for increasing representation of highly-senior women teachers in professional development trainings.

## Teachers' Satisfaction from In-Service Trainings

Over the past five years, Figure 7 shows the results regarding teachers' satisfaction with in-service training activities.

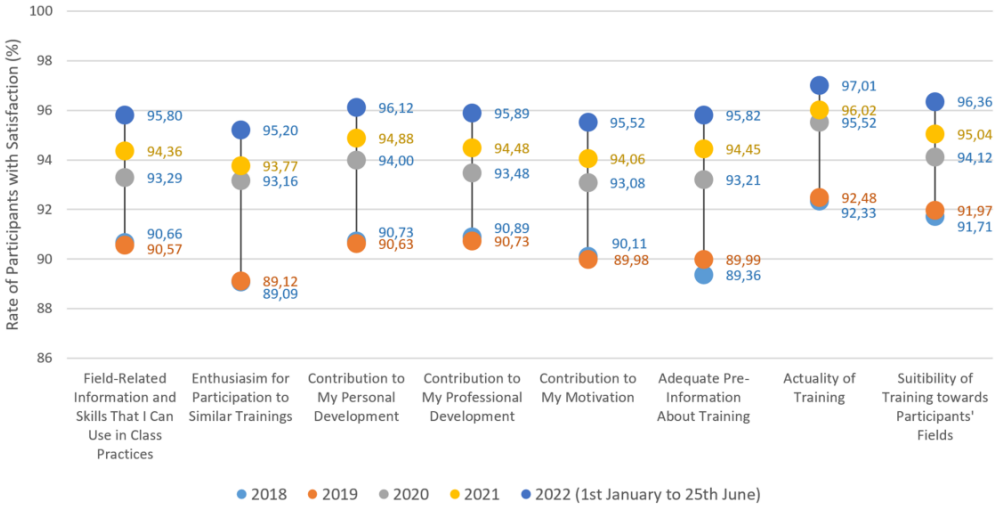



**Figure 7.** Teachers' Rate of Positive Responses to Diverse Aspects of Trainings between 2018 and 2022

Figure 7 indicates that teachers were highly satisfied with the educational activities of in-service trainings; however, the level of satisfaction varied from year to year. Teachers' satisfaction with teacher training activities reached its highest level in all areas covered. It is important to note that the extent and coverage of teachers' training resulted in an increase in their satisfaction. In addition, the areas of greatest satisfaction since 2018 were the desire to participate in new trainings, the increase in teacher motivation as a result of the trainings, and the improvement of preliminary data.

## DISCUSSION AND CONCLUSION

In-service training is an important mechanism for developing the skills of teachers and improving their abilities. Teachers are required to adapt to the profound changes in educational technologies, unexpected contingencies such as the COVID-19 pandemic, and the expansion of educational functions in the social sphere. The education system should therefore provide well-qualified professional development infrastructures for teachers and monitor the effectiveness of such infrastructures.

In Türkiye, in-service teacher training programs conducted by the Ministry of National Education (MoNE) have served as the primary mechanism for professional development for teachers. These in-service trainings have been structured by the MoNE with a centralized approach for many years, with the Ministry of the Navy taking sole responsibility for designing, planning, and implementing them.

Despite the fact that previous research has indicated that teachers in Türkiye benefit from the MoNE-designed in-service trainings (Ay, 2022; Doğan, 2009; Kaleci, 2018; Nemli, 2017; Özer, Suna & Sunar, 2021), these studies also provided valuable feedback on the areas that need improvement in order to enhance professional development nationwide. These studies recommended that trainings be designed in accordance with teachers' opinions, that practical skills be prioritized over theoretical knowledge, that teacher and administrator participation be increased, and that training subjects be diversified. Thus, proposed models for in-service training include increasing school autonomy, allocating a specific budget for teacher trainings, establishing teacher training hubs in educational institutions, increasing the coverage and extent of trainings, prioritizing practical skills, and designing trainings according to a lifelong learning approach.

According to the data-based studies on training effectiveness, teachers' long-term feedback on teacher training is mostly consistent. The research suggests that effective in-service training should emphasize social and emotional skills in addition to academic subjects, place an emphasis on practice rather than theory, reflect teachers' opinions and needs, and take place in an educational setting. A teacher training program with these characteristics has a greater potential to accelerate student achievement.

Among the three priorities articulated by the Ministry of National Education at the end of 2021, teachers' professional development was identified as one of the themes of the 20th National Education Council, which brings together a wide range of stakeholders in the Turkish educational system. By incorporating feedback from teachers and key research findings on effective teacher training, the in-service training approach was significantly improved in late 2021.

The new approach to teacher training aims to achieve two objectives: 1) increasing the coverage and extent of trainings by maximizing participation, and 2) revising training subjects and content according to teacher needs. Therefore, the MoNE revised the training program by adopting a practice-oriented approach, expanding and diversifying training subject matter, and repositioning schools as teacher training centers. The allocation of a school-based budget also increased the autonomy of individual schools in determining and meeting their teacher training needs. Additionally, a teacher and administrator mobility program was piloted to enable school staff to observe best practices in diverse schools throughout Türkiye and implement these practices at their own institutions. In order to achieve this transformation, the MoNE increased the budget allocated for in-service training by 35 times in 2022, amounting to approximately 300 million Turkish Liras.

As part of this study, we evaluated the initial results of the new approach on teachers' participation in and satisfaction with in-service trainings after the implementation of the first year, 2022. The preliminary results of the study indicate that the new approach resulted in a significant increase in participation in in-service training, exceeding the total number of participants since 2018. As a result, only half of 2022 is expected to have higher participation levels than the previous four years combined. In Türkiye, nearly all teachers have participated in at least one annual in-service activity for the first time. A significant increase in participation has also resulted in an increase in the average number of teaching hours per teacher, from 39 hours in 2018 to 250.1 hours in 2022 as a result of increased participation. As emphasized in the TALIS findings, teachers with greater seniority have participated significantly more than in previous years. In the period between 2018 and 2022, teachers with more than 20 years of experience more than doubled their participation in in-service training. Thus, the seniority distribution has become more balanced since 2021 as a result of an increase in the number of highly experienced teachers participating. According to the gender distribution data, women participation increased in all seniority groups at the same time. All indicators of participation improved as a consequence of the improvements.

The second objective of this study is to illuminate teachers' levels of satisfaction with training. After the in-service training, teachers were asked to complete a training questionnaire to assess their satisfaction with the training. Across all aspects of the training, including content, subjects, implementation, and motivation, teacher satisfaction increased. In 2022, the percentage of teachers who believe that training contributes to their personal and professional development, increases their motivation, and improves their practical skills peaked. The revised in-service training model has contributed to an increase in teacher satisfaction by taking into account the needs of teachers and diversifying the subjects. This is also important for the alleviating the achievement gap between schools (Atar, 2014; Suna et al., 2021; Suna & Özer, 2021; Suna et al., 2020a, 2020b), which is a long-term problem of Turkish education system (Özer, 2022a, 2022b). According to these findings, teacher satisfaction and access to in-service training increased concurrently in 2022.

With the enactment of the Teachers' Profession Law No. 7354 in 2022, the MoNE has taken an important step towards further supporting teachers. A new approach to teacher education is introduced by this law, which promotes teachers' postgraduate

education and encourages their postgraduate education. A clear definition of teaching as a career path will provide teachers with an improved experience with teacher training, as well as an increase in their personal rights (Özer, 2022a). Providing qualified in-service training for teachers leads to a cumulative increase in educational quality (Özer, 2022a, 2022b, 2022c). A strong in-service training program and the support of teachers' personal rights could lead to an increase in job satisfaction for teachers. When teachers find more opportunities to improve their skills and their well-being increases, these improvements will be reflected in their education processes, which ultimately will lead to continuous improvement in the education system. From the perspective of previous studies and working hypotheses, it is imperative to discuss the results and how they can be interpreted. It is important to consider the findings and their implications in the broadest possible context. There may also be a discussion of future research directions.

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**Statements of publication ethics**

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

**Author contribution**

M.Ö. conceived of the presented idea. M.Ö and H.E.S developed the theory and performed the computations. M.Ö and H.E.S verified the analytical methods. All authors discussed the results and contributed to the final manuscript.

**Researchers' contribution rate**

The study was conducted and reported with equal collaboration of the researchers.

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