EDITORIAL BOARD

CONTENTS

FOREWORD

Dear Readers, Authors, and Colleagues!

I am writing the foreword to the first issue in 2022 in the times of the pandemic crisis, which has affected our lives. It has brought big changes in education and in the psychoeducational sphere in both learners and teachers, as well as innovative educational technologies. Several of the ten studies in this issue focus on the above changes. They are interesting, but judge for yourself.

In the first study, Ali Erarslan and Mehmet Asmalı deal with the issues of Turkish EFL teachers' motivation towards the work tasks of class preparation, teaching, and evaluation of students. They emphasize that motivation plays a central role in teachers' instructional practice and that teaching quality and teacher effectiveness contribute positively to student achievement. In line with this, teachers face several tasks in their profession, and they exhibit various motivational levels consisting of different motivational constructs, such as intrinsic, introjected, identified, external motivation, and amotivation. Their findings show that EFL teachers' work task motivation displayed variations based on their gender, their age, the location and the type of their school.

Digital technologies and their role in children's lives are in the centre of our four authors' – Žaneta Gužíková, Simona Chicevič, Dušan Kostrub, and Sylvia Brychová – attention in the second research study. The aim of their investigation was to examine pedagogically significant applications of digital technologies and attempt to identify certain principles of educational influence in pre-primary education. For the above purpose, qualitative research design was applied. They identified identical and non-identical categories in opinions between children and parents relating to the use of digital technologies by children. They discovered that parental educational principles related to the use of digital technologies are opinion-determined.

As Filiz Avci claims in the study "Effects on Primary School Teacher Candidates of Developing and Implementing Jigsaw Technique Activities Enriched with Educational Games (JTEEG) in Science and Technology Teaching Lessons", it is important that teacher candidates who will educate students in the future develop their skill levels in order to improve their students' communication skills. JTEEG is effective in developing the communication skills of the classroom teacher candidates who will teach a science lesson for the first time, because they can increase the students' interest by making sure that they enjoy science as they are provided with and opportunity to learn through enjoyment by means of games and activities.

In the following study, Neslihan Arici Özcan presents an experiment, within which the Mindfulness-Based Thriving Programs was applied to decrease the perceived stress and increase mindfulness, thriving and self-efficacy levels in secondary school students. Thriving and mindfulness together have an important role in the development of self-efficacy and in decreasing perceived stress during adolescence. All the presented conclusions highlight the potential contribution of eclectic mindfulness practices for youth.

Mátyás Turós's paper entitled "Relationship between Waldorf Pedagogy and Information and Communication Technologies in Hungary" provides an overview of the pedagogical and epistemological reasons why Waldorf pedagogy and Waldorf Steiner schools take a critical approach to the use of information and communication technologies (ICT) and to "screens" in general, together with mapping out the current state of Waldorf schools in Hungary.

The study by Esra Asici and Halil Ibrahim Sari is focused on the university environment. They deal with the issues of depression, anxiety, and stress in university students. The aim of the study is to investigate the direct and indirect effects of dysfunctional attitudes (perfectionism and dependency) and age on depression, anxiety, and stress and the mediator role of self-esteem in these relationships in undergraduate university students. The results revealed that low self-esteem and the presence of dysfunctional attitudes are important risk factors in terms of university students' mental health. In order to prevent depression, anxiety, and stress in university students, the university counselling centres may organize individual or group counselling practices, which should aim to support the development of self-esteem. Alongside with that, psycho-educational programs aiming to increase self-esteem should be conducted.

As accentuated by Hayriye Reyhan Çelik and Ömür Kaya Kalkan in the study entitled "Organizational Justice, Perceived Stress and Leader Support as Predictors of Teachers' Job Satisfaction", teachers' job satisfaction has a positive effect on successful functioning of schools, which contributes to the quality of education, students, teachers, and schools. On the other hand, an increase in the level of dissatisfaction causes disciplinary problems, inefficiency, job dissatisfaction, alienation from the job, or leaving the job. Therefore, research on teachers' job satisfaction can provide a scientific basis for solving problems.

The purpose of the paper by Tetiana Humenyuk entitled "Formation of Art Design Skills (Crossover Point) in the Process of University Education" is to characterize art "crossover-projects" in the context of present culture and to reveal the method of preparation of future specialists to art design during getting university education. The article analyzes the methodology of training

future specialists for art design and points to the fact that the "purity" of art is no longer a criterion for creativity and professional success.

A Turkish-Norwegian cooperation has resulted in a research study by Yunus Emre Akbana and Kenan Dikilitaş entitled "EFL Teachers' Sources of Remote Teaching Anxiety: Insights and Implications for EFL Teacher Education". The authors focus on remote teaching anxiety and their analysis revealed two major themes: digitalisation-related concerns and online pedagogy-related concerns. Statistically significant difference was only found between anxiety sources and online teaching experience but not between gender, age, teaching experience, work setting and anxiety sources. Their findings differ from those by Ali Erarslan and Mehmet Asmalı.

The final study "What are Turkish Preservice Science Teachers' Claims about Daily Life-Threatening Situations?" was written by Handan Ürek and Mustafa Çoramık who investigate the claims of preservice science teachers about daily life-threatening situations. The study is focused on the association of scientific knowledge with daily life, which is one of the aims of science education. The results indicate that preservice teachers associate their scientific knowledge with daily life-threatening situations at various levels, but also gaps in their associations occurred. Readers can find out more about them in the paper. Obviously, the benefits of science education can be revealed only following the application of the gained knowledge in everyday life as they have the potential to increase life quality by eliminating a range of problems.

Dear Readers, these are our studies, enjoy reading them. On behalf of the Editorial Office, I wish you pleasant moments in the company of our Acta Educationis Generalis and, above all, good health.

Viola Tamášová
Editor-in-Chief

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EFL Teachers' Work Tasks Motivation towards Class Preparation, Teaching, and Evaluation of Students

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Abstract:
Introduction: Motivation plays a central role in teachers' instructional practices. Teaching quality and teacher effectiveness contribute positively to student achievement. In line with this, teachers face several tasks in their profession, and they exhibit various motivational levels consisting of different motivational constructs, such as intrinsic, introjected, identified, external motivation, and amotivation. Therefore, this study aims at revealing Turkish EFL teachers' motivations towards the work tasks of class preparation, teaching, and evaluation of students, which all teachers have to conduct in their profession.
Methods: To collect data, Work Tasks Motivation Scale for Teachers was used. The sample consisted of 1786 EFL teachers teaching throughout Turkey in all types of schools and locations across seven geographical regions.
Results: The quantitative data revealed that motivational constructs vary according to the work tasks of class preparation, teaching, and evaluation of students indicating that teacher motivation has a multifaceted nature and is a non-uniform construct.
Discussion: The results indicated that Turkish EFL teachers did not value the task of classroom preparation, while the task of evaluation of students seemed to be valued. Gender-based differences also indicated that female teachers had higher amotivation and external regulation levels towards classroom preparation and teaching despite their higher levels of intrinsic motivation towards evaluation of students. In addition, considering age variable, the younger group of EFL teachers were found to be more intrinsically motivated towards teaching and evaluation of students compared to the older groups while being more amotivated towards the task of classroom preparation.

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Limitations: Despite the high number of the participants, the findings of the study are limited to the analyses of quantitative data as the main source.
Conclusions: The findings of the study indicated that EFL teachers working in all regions and cities of Turkey demonstrated high levels of a) amotivation towards classroom preparation, b) introjected regulation towards teaching, and c) intrinsic motivation towards evaluation of students. Moreover, EFL teachers' work task motivations displayed variations based on their gender, their age, the location and the type of their school. Further research could investigate potential reasons for the differences in EFL teachers' motivation levels while further increasing the reliability of the results by integrating qualitative data through interviews, observations, or teacher diaries.

Key words: EFL teachers, self-determination theory, teacher motivation, teaching profession, work tasks motivation.

Introduction

Teaching has always been and is likely to be one of the most important professions for the future of humanity (Bishay, 1996). Therefore, literature has welcomed a rekindling of interest in drawing the portrait of an effective teacher (Baytur & Razı, 2015; Miller, 1987; Orgoványi-Gajdos & Kovács, 2020; Prodromou, 1991; Shishavan & Sadeghi, 2009; Werbinska, 2009). Among the multiple variables playing role, motivation is of central importance in teachers' efficiency and success (Jesus & Lens, 2005; Recepoğlu, 2013). Since teacher motivation is related to several significant aspects, such as students' achievement (Bishay, 1996), implementation of educational reforms, or teachers' own satisfaction and fulfillment (Jesus & Lens, 2005), it is crucial to delve into teacher motivation.

Despite teacher motivation's significance, their dissatisfaction with their jobs (Bishay, 1996) and a lack of work motivation (Jesus & Lens, 2005) are not desired states. A brief overview of the existing research offers insights into how various approaches and models have been employed to demonstrate teacher motivation. Factors playing role in choosing teaching as a career (Özsoy, Özsoy, Özkara, & Memiş, 2010; Topkaya Zehir & Üztosun, 2012; Watt & Richardson, 2007), motivating or demotivating factors in different school types (Öztürk Ölmezer, 2015; Seebaluck & Seegum, 2013; Sugino, 2010), and assessment of teacher motivation (Feyyat, 2010; Recepoğlu, 2014) were among the popular topics addressing the issue of teacher motivation.

One aspect of teacher motivation that has been overlooked is the question why and how teachers are involved in their work tasks and to what extent they integrate with various tasks (Fernet, Senecal, Guay, Dowson, & Marsh, 2005).

One framework to conceptualize teacher motivation is Self-Determination Theory (SDT; Deci & Ryan, 1985).

1 Self-Determination Theory

Human nature is inclined to learn, internalize knowledge, and assimilate values (Niemiec & Ryan, 2009). However, idealizing people as always curious, inspired, and responsibly striving to learn may be too optimistic since, despite most people's considerable effort and commitment, apathy, irresponsibility, and alienation are abundant regardless of gender, maturity, culture, and social strata (Ryan & Deci, 2000). What matters in people's being active or passive is the social contexts catalyzing differences in motivation rather than biological endowments (Ryan & Deci, 2000).

Teachers seem to be the best actors in these social contexts to facilitate, cultivate, and harness internal tendencies of students to be curious and interested through guiding learning and development (Niemiec & Ryan, 2009). However, what exactly optimizes teachers' engagement in this process and motivates them opens up new gates for researchers. Self-Determination Theory (Deci & Ryan, 1985) is one of the pathfinders as a theoretical framework in understanding teachers' motivation.

Motivation is placed along a self-determination continuum representing the reasons for action in SDT. In this continuum, intrinsic motivation is hypothesized to deal with the task for itself with the ultimate aim of enjoying satisfaction (Vallerand, 1997). No restrictions take place in the performance that is done with volition (Fernet et al., 2008). The type of motivation that stands in the middle of the spectrum encapsulating 'identified', 'introjected', and 'external' regulations, ordered from higher to lower levels of self-determination, is extrinsic motivation. This type of motivation is commonly perceived as non-autonomous (Ryan & Deci, 2000). However, despite instrumentalism and non-autonomy in its nature (Fernet, Senécal, Guay, Marsh, & Dowson, 2008), SDT posits that relative autonomy may considerably vary across various behaviors in extrinsic motivation (Ryan & Connell, 1989). At the leftmost side of the continuum with highest level of self-determination is identified regulation. Rather than feeling the pressure, people with identified regulation perform the activities with higher freedom due to the match between the task and their values and personal goals (Gagne & Deci, 2005). Introjected regulation, on the other hand, occurs when people feel the pressure stemming from anxiety, shame, or guilt in order to assure that a certain behavior is performed (Fernet et al., 2008). The least self-determined extrinsically motivated behaviors are called externally regulated (Ryan & Deci, 2000). Externally regulated people perform tasks to obtain a reward or avoid an undesired consequence (Gagne & Deci, 2005). The behavior of a student studying for an examination just in order not to let his/her parents down might be an example for externally regulated behavior (Vallerand, 1997). Finally, at the rightmost side of the continuum with the lowest level of

self-determination stands amotivation. Amotivated people are not aware of the reasons why they are performing tasks, and they do not have intentions for them (Fernet et al., 2008). Lack of intention stems from a sense of incompetency (Bandura, 1986), lack of feeling hopeful to achieve the desired outcomes (Seligman, 1975), and not valuing the activity (Ryan, 1995).

One advantage of this theory is its focus on quality rather than quantity of motivation (Fernet et al., 2008). Studies have shown that external pressure arises as the reason of low or lack of self-determination in teachers' actions in the classroom (Ryan & Brown, 2005). With regard to pressure, Niemiec and Ryan (2009) indicate a negative correlation between pressure on teachers to achieve specified outcomes and teachers' effective, interesting, and inspiring practices as well as their enthusiasm and creative energy. Considering the likely impacts of motivation types ordered along a self-determination continuum, the more self-determined the teachers become (with intrinsic motivation and identified regulation), the more positive outcomes appear. On the other hand, the decrease in self-determination (introjected regulation, external regulation, and amotivation) leads to negative outcomes (Fernet et al., 2008). The related literature supports the claim that intrinsic motivation is associated with higher job satisfaction (Shah, Rehman, Akhtar, Zafar, & Riaz, 2012), student engagement and attentiveness (Demir, 2011; Fernet, Trepanier, Austin, & Levesque-Cote, 2016), lower burnout (Fernet, Chanal, & Guay, 2017), commitment (Fernet et al., 2016), and positive school environment (Fernet et al., 2016). However, controlled motivation in teachers generated negative school environment, emotional exhaustion (Fernet et al., 2016), work stress and ill-being (Nie, Chua, Yeung, Ryan, & Chan, 2015). Thus, unless policy makers and school administrators take teachers' motivation into account, it is highly likely that both teachers and students will suffer from motivational and learning problems (Deci & Ryan, 2002).

2 Teacher motivation

Teacher motivation has attracted researchers across various socio-cultural contexts over the past decades (Han, Yin, & Boylan, 2016). Research on teacher motivation has predominantly underscored the significance of competence beliefs in this respect (Fernet et al., 2008). Nevertheless, regardless of their competence, teachers may perform some tasks due to internalizing the values of them, whereas some may undertake a task just because of external pressure or benefits (Fernet et al., 2008).

Teacher motivation-related research has also proliferated in the field of language teacher education recently (Fen Ng & Kiat Ng, 2015; Hiver, Kim, & Kim, 2018). This growth of interest has also been observed in Turkey, where 65000 English as a foreign language (EFL) teachers in different levels of state schools are employed (TÜİK, 2019). Despite the high number of teachers, Turkish students have continuously faced English proficiency problems

(Savaşkan, 2016). The recent English proficiency index has also concurred this issue by placing Turkey in the 79th position among 100 countries in total and penultimate order in 33 European countries (Education First, 2019). However, the studies conducted in language teacher motivation in Turkey have mostly been concerned with too general issues, such as motivating (Erkaya, 2013; İpek & Kanatlar, 2018) and demotivating factors (Aydin, 2012), and choosing language teaching as a career motivation (Özsoy et al., 2010; Topkaya Zehir & Uztosun, 2012). Furthermore, this general focus on teacher motivation is centered on higher education (Erkaya, 2013; İpek & Kanatlar, 2018; Öztürk Ölmezer, 2015), leaving other levels of educational contexts overlooked.

Considering these facts, employing the Work Tasks Motivation Scale for Teachers (henceforth WTMST) designed by Fernet et al. (2008) based on SDT, we direct our focus on potential differences among EFL teachers working in different levels of public schools all around Turkey. While performing their profession, teachers undertake different tasks, and while fulfilling these responsibilities, they may have different levels of motivation, such as lesson preparation, active teaching, and assessment of students. They may undervalue some tasks because of external pressure, whereas some teachers might enjoy conducting certain tasks. In this respect, the present nationwide comprehensive research aims to explore how controlled or self-determined motivation Turkish EFL teachers demonstrate in their class preparations, active teachings, and evaluations of students' performances. The following research questions are sought in the study:

1. What are the participating EFL teachers' motivation levels towards the work tasks of class preparation, teaching, and evaluation of students?
2. Are there significant differences in teachers' motivations towards class preparation, teaching, and evaluation of students based on their demographic characteristics, such as their age, gender, the type and the location of their school?

3 Methodology

Intended to explore the EFL teachers' work tasks motivations in Turkey, the study is designed following survey research methodology to have an-in-depth data from a large population regarding individuals' characteristics, opinions, attitudes, and behaviors (Dornyei & Csizér, 2012). For the collection and analyses of the data, quantitative research is adopted to find out teachers' motivational aspects regarding class preparation, teaching, and evaluation of students among the specific tasks they need to perform to teach the language in schools. As Ushioda (2001) highlighted, many motivational studies in the field of language learning and teaching benefitted from quantitative research paradigm due to the effectiveness of quantitative research in collecting data regarding a multifaceted construct of motivation. Thus, the work tasks

motivations of the EFL teachers were investigated making use of 'WTMST' in this study.

3.1 Setting and participants

For data collection, seven geographical regions and all school types from primary to high schools across Turkey were targeted in the study. English language teaching starts with the second grades in primary school and all students receive at least two hours of English instruction until the end of high school. In order to have an in-depth understanding revealing the general picture of EFL teachers' work-task motivational constructs in Turkey, all location types involving villages, counties, and cities were involved in the study. The reason for this is that students receive English courses in primary schools located not only in cities but also in small villages. While all school types exist in cities, only primary schools are found in towns and villages. Counties with a population of 5.000+ people may also have all school types (primary to high school).

In terms of geographical regions in Turkey, the Marmara Region is the most densely populated one due to industrialization. Istanbul, which is located in this region, is the biggest city with most EFL teachers working in state schools. On the other hand, Eastern Anatolian Region and South-Eastern Anatolian Region are the ones with the least densely populated cities and other location types (counties and villages). Another reason for the inclusion of all location types is that if this study focused only on cities, teachers' work-tasks motivations working in these two regions would not be reflected since most EFL teachers work in cities or counties in Eastern Anatolian Region and South-Eastern Anatolian Region rather than cities. Thus, we believe that this study will be able to draw a general picture of state school EFL teachers' motivations towards various work tasks in Turkey.

A total of 1786 EFL teachers participated in the study. The participants worked in Turkish state schools throughout the country. In order to have a detailed analysis of the teachers regarding their work tasks motivation, various aspects of teacher demographics, i.e., gender, age, graduation, teaching experience, school type, school location and region, were identified as shown in Table 1.

Table 1

Distributions of demographic variables

Variable	*n*	*%*
Gender		
Female	1208	67.6
Male	578	32.4
Age		
21-25	160	9.0

26-30	415	23.2
31-35	417	23.3
36-40	363	20.3
41-45	235	13.2
46-50	106	5.9
51-55	64	3.6
56+	26	1.5
Graduation		
English Language Teaching	1316	73.7
English Language & Literature	318	17.8
American Language & Literature	45	2.5
Linguistics	28	1.6
Translation Studies	24	1.3
Non-language related depts. (classroom teaching, etc)	55	3.1
Teaching Experience		
0-2 yrs	231	12.8
3-5 yrs	393	22.0
6-8 yrs	256	14.3
9-11 yrs	151	8.4
12-14 yrs	189	10.5
15-17 yrs	174	9.7
18-20 yrs	183	10.2
21-23 yrs	99	5.5
24+yrs	110	6.1
School Type		
Primary	233	13.0
Secondary	835	46.8
High School	690	38.6
Public Education Center	10	.6
Other	18	1.0
Region		
Marmara	464	26.0
Central Anatolia	332	18.6
South-Eastern Anatolia	229	12.8
Eastern Anatolia	208	11.6
Mediterranean	185	10.4
Aegean	202	11.3
Black Sea	166	9.3
School Location Type		
Village/Town	251	14.1
County	731	40.9
City	804	44.0

The analysis of the demographic variables in the study showed that among 1786 participants, the majority of them were female teachers of English (n=1208), and nearly three quarters of the participants were between the ages of 21-40 (75.8%).

Regarding the participant teachers' university graduation, English language teaching graduates ranked the first with a percentage of 73.7% (n=1316). Regarding the teaching experience of the participants, the highest rank belonged to the teachers with a teaching experience of 3-5 years (n=393). In terms of the school type, nearly half of the participants (n=835, 46.8%) worked in secondary schools (grades 5-8). Across seven geographical regions in Turkey, 26% of the teachers (n=464) worked in the Marmara Region, which is followed by Central Anatolia Region (n=332, 18.6%), where Ankara, the capital of Turkey, is located. Regarding location, nearly 85% of the participant teachers worked in cities and sub-provinces.

3.2 Data collection procedure

To reveal EFL teachers' motivations regarding specific work tasks, the data of this study were collected via WTMST (Work Tasks Motivation Scale for Teachers), developed and validated by Fernet et al. (2008). WTMST was specifically constructed to assess six different work tasks. These work tasks were 'class preparation', 'teaching', 'evaluation of students', 'classroom management', 'administrative tasks', and 'complementary tasks.' In the work task of class preparation, teachers' motivations regarding their selection of the topics to teach, materials to use, drawing the teaching practices, and any other preparation tasks prior to teaching are targeted. In the teaching task, teachers' motivational aspects in terms of applying teaching practices, managing question-answer sessions, or addressing to students' needs in the classroom are dealt with. In the evaluation of students as a work task type, on the other hand, teachers' giving feedback, conducting assessments and examinations as well as evaluating and entering grades are handled in the scale. Additionally, in the last three work tasks, namely, classroom management, administrative and complementary tasks, management, and administration related tasks, such as classroom organization, meetings, disciplinary cases, and extracurricular activities or committee works are addressed (Fernet et al., 2008).

In this study only the first three work tasks motivations (class preparation, teaching, and evaluation of students) for the teachers were included since other tasks, such as administrative and complementary tasks were not experienced by all teachers. However, all teachers have the tasks of class preparation, teaching, and evaluation of students. In WTMST, under these six work tasks, teacher motivations were investigated under five motivation types labeled as intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation. The scale had 15 items for each work task to assess six motivational constructs. A total of 45 items were utilized in this study to assess teachers' motivational constructs. The items in WTMST were based on a 7-point frequency response scale and the item responses varied from 'does not correspond at all' to 'corresponds completely.' Fernet et al. (2008) explain that the WTMST statistically had good fit indices ($\chi 2$=5658.93; df=3255; CFI

(Comparative Fit Index)=.94; NNFI (Non-formed Fit Index)=.93; RMSEA=.04) indicating that the WTMST is a validated data collection tool to gather motivational data from teachers regarding various work tasks they performed in their professional life. For the scale was a comprehensive data collection tool for various work tasks involving five motivation types, it was used as a survey tool to collect data from teachers in this study.

The data collection process for the study was initiated by creating an online survey form that was composed of two major parts where the participants' demographic information regarding their personal variables, such as age and gender, and professional information in terms of their university graduation, teaching experience, school type, school region and area, were included. Apart from the demographic part, the second part included 45 items regarding 'class preparation', 'teaching,' and 'evaluation of students' aspects for EFL teachers' motivations. The constructed online survey tool was distributed to every EFL teacher working in state schools across Turkey through the Ministry of National Education (MoNE). The data collection process was completed in the fall term of 2019-2020 teaching year at the end of 2019. Accordingly, 1786 teachers took part in the study as the participants.

3.3 Data analysis

Since this study was designed as a quantitative research, quantitative statistical analyses were run to analyze EFL teachers' motivational contracts regarding three different work tasks. In the analyses of the data, SPSS was utilized for various tests. Initially, the reliability was tested, and Cronbach's alpha coefficient was calculated as .84 indicating the reliability of the WTMST, which was followed by checking the normality of distribution for the gathered data. Making use of Skewness and Kurtosis coefficients, it was seen that the data were distributed normally which allowed to run parametric tests for further analyses. In analyzing the participants' demographic variables, frequencies and percentages were utilized. To check the teachers' motivational differences based on the demographic variables, such as age, school type, region and area, one-way ANOVA, was used. In other to have a detailed analysis to see the variances among groups, Tukey, as a post-hoc test, was run. Finally, for the gender variable, independent samples t-test was utilized.

4 Findings

RQ1. What are the participating EFL teachers' motivation levels towards the work tasks of class preparation, teaching and evaluation of students?

The first research question aimed at finding out the participants' motivations towards the work tasks of class preparation, teaching, and evaluation of the students. Following the analysis of the data, the teachers' work tasks motivations were computed separately considering five different motivational constructs as seen in Table 2.

Table 2

Descriptive statistics regarding the EFL teachers' motivations towards class preparation, teaching, and evaluation of students

Motivation types/work tasks	*Class preparation*		*Teaching*		*Evaluation of students*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Intrinsic Motivation	4.01	.99	5.06	.95	5.68	.98
Identified Regulation	4.48	.77	5.14	.72	5.21	.97
Introjected Regulation	5.48	.95	6.00	.82	4.71	.83
External Regulation	5.22	.74	5.14	.65	4.34	1.03
Amotivation	5.73	.94	4.42	.77	4.82	.76

When the teachers' motivational levels for the motivational constructs in the class preparation are analyzed, the findings show that their amotivation levels were comparatively higher than the other motivational constructs with a mean score of 5.73, which shows that the teachers see no value of making preparation for the class. The amotivational aspects of the teachers in conducting the preparation for the class indicate no level of self-determination. Amotivation generally occurs when individuals see no value in conducting the action or expecting no concrete outcome of the action performed. Introjected regulation was the second motivational construct among others with a mean score of 5.48 indicating that class preparation was rather not internalized but performed as a necessity. The findings show that apart from these, the participants were externally motivated for class preparation, which received the third highest mean score as 5.22. This means that the participants conducted class preparation due to external factors, such as receiving reward or avoiding punishment. These findings indicate that class preparation is not an activity type for teachers to be performed by their own desires but rather conducted for external contingencies. The findings for identified regulation as a motivational construct assessed for class preparation indicate that the participant teachers internalized class preparation not for external contingencies but with a feeling of necessity which otherwise would cause feeling of guilt. Ranking the fourth with a mean score of 4.48, identified regulation was a motivational construct, which received one of the lowest scores together with intrinsic motivation as the lowest one (M=4.01). Intrinsic motivation is the construct, which is a sign of the self-determination yielding autonomous behaviors conducted by teachers' own interests with no expectation from external factors. In general, based on the findings, it is seen

that amotivation was the most apparent motivational construct while intrinsic motivation was the last one for teachers in terms of class preparation.

Teachers' motivations were investigated with respect to the work task of teaching, which involved activities, such as giving instruction in the classroom, managing classroom activities, dealing with students' needs. The results regarding the teachers' motivational levels based on motivational constructs revealed that introjected regulation was the most evident motivational construct with the highest mean score (M=6.00) among other constructs. This shows that the act of teaching was partially internalized due to an inner pressure on the part of the teachers. At the same time, findings show that both identified regulation and external regulation received equal mean scores of 5.14, indicating that while for some teachers teaching motivation came from external factors, for others teaching was valued since in identified regulation they regarded this work task as valuable and important. The mean score for intrinsic motivation was 5.06. This shows that for some teachers the act of teaching was self-directed, autonomous, and fully internalized. The lowest mean score among these motivational constructs belonged to amotivation (M=4.42), which indicates that unlike class preparation as a work task, teachers comparatively favor the work task of teaching since it received the lowest mean score, while amotivation was the highest in work task of class preparation.

The teachers' motivational levels regarding evaluation of students, which included work tasks of preparing assessment and exams, reading, checking, and evaluating students' progress, as well as giving feedback to students for their exam scores, were analyzed based on five different motivation constructs. It was found that their intrinsic motivation had the highest mean score (M=5.68), which shows that they internally and autonomously conduct this task. Apart from this, the teachers' identified regulation levels were also high for evaluation of students. The mean score for identified regulation was 5.21. This illustrates that they internally value the task of evaluation, but not as autonomous and self-directed as in the intrinsic motivation. On the other hand, while some teachers valued and internalized the task of evaluation of students, amotivation was still apparent (M=4.82) for some who had no motivation towards the task of student evaluation.

In terms of introjected regulation as a motivational construct, the mean score was 4.71, which was in the third rank showing that some teachers' conduct this task by external locus of causalities, which is not self-driven. The final motivational construct, which ranked the last, was external motivation with the mean score of 4.34, indicating that the work task of student evaluation was conducted based on external contingencies for some of the teachers.

RQ2. Are there significant differences in teachers' motivations towards class preparation, teaching, and evaluation of students based on their demographic

characteristics, such as their age, gender, the type and the location of their school?

The impact of various demographic variables on the EFL teachers' motivation on different tasks was examined to answer the second research question. First, descriptive statistics and independent samples t-test were performed to check any gender-based differences among the EFL teachers concerning their work tasks motivation. As Table 3 indicates, the female EFL teachers had higher mean scores for all motivation constructs for all work tasks except intrinsic motivation in class preparation.

Table 3

T-test results comparing male and female EFL teachers' motivation on work tasks

Motivation constructs	*Male*		*Female*		*t*	*p*	*Cohen's d*
	M	*SD*	*M*	*SD*			
CPINTMOT	3.04	.99	2.99	.99	.928	.353	0.001
CPIDTREG	3.44	.76	3.51	.77	1.677	.094	0.002
CPINTROJCTDREG	4.34	.97	4.55	.94	4.276	.000	0.005
CPEXTREG	4.13	.77	4.26	.72	3.731	.000	0.004
CPAMOT	4.59	.98	4.80	.92	4.492	.000	0.005
TINTMOT	4.03	.94	4.08	.96	1.101	.271	0.001
TIDTREG	4.14	.75	4.15	.71	-.211	.833	0.001
TINTROJCTDREG	4.93	.85	5.04	.80	2.740	.006	0.003
TEXTREG	4.06	.64	4.18	.64	3.902	.000	0.004
TAMOT	3.41	.76	3.43	.77	-.668	.504	0.001
ESINTMOT	4.60	.99	4.72	.97	2.407	.016	0.003
ESIDTREG	4.21	1.00	4.22	.96	-.146	.884	0.001
ESINTOJCTDREG	3.68	.85	3.74	.82	1.490	.136	0.002
ESEXTREG	3.31	1.02	3.35	1.04	-.731	465	0.001
ESAMOT	3.78	.77	3.84	.75	1.755	.079	0.002

Note. The first letters of each construct refer to one specific work task, i.e. 'CP' refers to 'classroom preparation,' 'T' refers to 'teaching,' and 'ES' refers to 'evaluation of students'. The following parts of the constructs are abbreviated forms of motivation types (INTMOT = intrinsic motivation, IDTREG = identified regulation, INTROJCTDREG = introjected regulation, EXTREG = external regulation, AMOT = amotivation).

Male and female distributions were sufficiently normal for the purposes of conducting a t-test with skewness of -.75 (SE=.058) and kurtosis of -1.43 (SE = .116). Moreover, the assumption of homogeneity of variances was tested and satisfied via Levene's F test for all motivational constructs. The results indicated significant differences for CPINTROJCTDREG (male: M=4.34, SD=.97, female: M=4.55, SD=.94, t(1784)=4.276, p=0.00), CPEXTREG (male: M=4.13, SD=.77, female: M=4.26, SD=.72, t(1784)=3.731, p=0.00), and CPAMOT

(male: M=4.59, SD=.98, female: M=4.80, SD=.92, t(1784)=4.492, p=0.00) in classroom preparation work task category; TINTROJCTDREG (male: M=4.93, SD=.85, female: M=5.04, SD=.80, t(1784)=2.740, p=0.006) and TEXTREG (male: M=4.05, SD=.64, female: M=4.18, SD=.64, t(1784)=3.902, p=0.00) in teaching work task category; and ESINTMOT (male: M=4.60, SD=.99, female: M=4.72, SD=.97, t(1784)=2.407, p=0.016), in evaluation work task category.

The second demographic variable was the age. A one-way ANOVA was conducted to compare the work tasks motivation of the EFL teachers from eight different age groups. As the assumptions of normal distribution and homogeneity of variance need to be met in order to calculate ANOVA, Kolmogorov–Smirnov test was employed to decide whether samples were normally distributed across the groups and the motivation type scores. Moreover, Levene's test of equality of error variances showed that variances across the groups were homogenously distributed. A significant difference among the groups was found at the $p<.05$ level for CPINTMOT, F(7, 1778)=2.136, p=0.037. Post hoc comparisons using Tukey test showed that the mean score for the EFL teachers between the ages 41-45 (M=3.15, SD=0.95) was significantly higher than that of ones between 31 and 35 (M=2.89, SD=1.00).

Another significant difference was found among the groups in CPIDTREG, F(7, 1778)=2.652, p=0.010. Tukey post hoc results indicated that 21-25-year-old EFL teachers (M=3.34, SD=0.78) had significantly lower mean scores than EFL teachers over 55 (M=3.87, SD=0.87). Introjected regulation in class preparation task (CPINTROJCTDREG) showed significant differences among the groups as well, F(7, 1778)=4.533, p=0.000. The youngest group of EFL teachers (aged 21-25) (M=4.81, SD=0.90) had significantly higher mean scores compared to all other age groups except over 55. The last category in class preparation that showed significant differences among the groups was amotivation (CPAMOT), F(7, 1778)=4.500, p=0.000. The youngest group of EFL teachers (aged 21-25) (M=5.06, SD=0.89) reported significantly higher amotivation in class preparation than other age groups except the ones over 55.

In the task of teaching, the only motivation type that showed significant difference among different age groups was intrinsic motivation (TINTMOT), F(7, 1778)=5.441, p=0.000. As in the case of some other motivation types, the EFL teachers aged 21-25 had the highest intrinsic motivation (M=4.30, SD=1.02) according to Tukey post hoc test results.

Two motivation types showed significant differences among the age groups in the work task of evaluation of students. Intrinsic motivation was the first one in which the EFL teachers aged 21-25 (M=4.94, SD=.95) reported higher level of motivation compared to the ones aged 31-45, F(7, 1778)=3.529, p=0.001. The second motivation type was regulation, F(7, 1778)=4.065, p=0.000. The identified regulation of EFL teachers aged 21-25 (M=4.41, SD=1.03) and 26-30

(M=4.35, SD=.97) was significantly higher than the ones aged 31-35 (M=4.06, SD=.95).

The impact of school area on the work task motivation of EFL teachers was also investigated using one-way ANOVA test. A significant effect of school area was found at the p<.05 level for three school areas (village/town, county, city) for identified regulation in classroom preparation task, F(2, 1783)=5.97, p=0.003. Post hoc comparisons using Tukey test showed that the mean score for the EFL teachers working in cities (M=3.54, SD=0.77) was significantly higher than those of working in villages (M=3.35, SD=0.74). Additionally, in the task of teaching, the EFL teachers' motivation was significantly different from one another for intrinsic motivation, F(2, 1783)=4.573, p=0.010. Tukey post hoc test results indicated that the EFL teachers working in counties (M=4.12, SD=0.94) reported significantly higher intrinsic motivation than the ones working in cities (M=3.99, SD=0.97).

The next demographic variable was seven geographical regions the EFL teachers were working in. The effect of these geographical regions on the work tasks motivation of EFL teachers showed significant differences in two tasks, i.e. classroom preparation and evaluation of students. First, significant differences were found among the EFL teachers' intrinsic motivation in classroom preparation task, F(6, 1779)=2.906, p=0.008. The intrinsic motivation of EFL teachers working in Central Anatolia Region (M=3.18, SD=1.04) was significantly higher than the ones working in the Marmara Region (M=2.96, SD=0.98) and Black Sea Region (M=2.83, SD=0.91). EFL teachers' introjected regulation, F(6, 1779)=3.756, p=0.00, and external regulation, F(6, 1779)=2.369, p=0.028, were also reported to be significantly different among the participants working in different regions for the task of evaluation of students. In terms of introjected regulation, Tukey post hoc test results indicated that the EFL teachers working in South-Eastern Anatolia (M=3.85, SD=0.83) and Mediterranean Region (M=3.85, SD=0.79) had significantly higher introjected regulation than the ones living in Black Sea Region (M=3.54, SD=0.87). The EFL teachers working in Black Sea Region (M=3.14, SD=.97) also had significantly lower external regulation than the ones working in Central Anatolia Region (M=3.47, SD=1.08).

The last demographic variable investigated was school type. An analysis of variance indicated that the impact of school type was significant in evaluation of student task for intrinsic motivation, F(4,1781)=3.755, p=.005 and amotivation, F(4,1781)=3.621, p=.006. Post hoc analyses using Tukey post hoc criterion showed that the EFL teachers working in primary (M=4.75, SD=.95), secondary (M=4.70, SD=.96), and high schools (M=4.66, SD=.99) had significantly higher intrinsic motivation than the ones working in other school types like science and art centers (M=3.85, SD=1.11). Moreover, the EFL teachers working in public education centers (M=4.43, SD=.59) had higher amotivation compared to the ones working in science and art centers (M=3.44, SD=.82).

5 Discussion

It is widely acknowledged that motivation plays a crucial role not only on the part of the learning processes of students but also for teachers in language teaching to conduct a number of work tasks for effective teaching. Teachers' motivation is principally represented by their enthusiasm and commitment towards teaching (Fen Ng & Kiat Ng, 2015). As it is the case for all human beings, teachers' motivation demonstrates both stability and variability (Hiver et al., 2018). Although motivation as a construct has been investigated in many studies, review of the literature indicates a gap regarding work tasks motivations of EFL teachers. Thus, this study aimed at exploring EFL teachers' motivations towards the work tasks of class preparation, teaching, and evaluation of students. A number of significant findings were revealed with the analysis of the data that were collected from a large sample of participants working in state schools across Turkey.

The research questions posed for the study aimed at understanding EFL teachers' multitask motivations at school. The findings for the first research question showed that teachers' motivations varied significantly across different work tasks. It is evident from the findings that teacher motivation is a multifaceted and a non-uniform construct since their motivations change depending on the work task to be conducted, which is also supported by Fernet et al. (2008). In terms of the specific work tasks, the teachers' motivations for each task of class preparation, teaching, and evaluation of students changed considerably. In detail, it was found that amotivation had the highest mean score in class preparation, while intrinsic motivation was the lowest among other motivational constructs. It is acknowledged that class preparation plays a critical role for an effective teaching since teachers address, plan, and organize teaching content, activities, and materials based on the course objectives before actual teaching (Auster & Wylie, 2006; Manasia, Ianos, & Chicioreanu, 2020). Class preparation underlies the learning outcomes for students (Gross, Pietri, Anderson, Moyano-Camihort, & Graham, 2015) and for teachers. It is the pathway for increasing the quality of teaching in terms of efficiency and effectiveness. However, the findings in this study suggest that EFL teachers were amotivated for class preparation with the highest mean score compared to other motivational constructs. As Ryan and Deci (2000) state, amotivation may be the result of not valuing the activity or not believing in getting the desired outcomes of doing the activity. In line with this, it has been found that for most EFL teachers in Turkey, class preparation is not valued. or they do not believe in its yielding the intended outcomes. The reasons why EFL teachers in Turkey do not value class preparation may be varied and complex. Several studies highlighted that reforms initiations to increase the quality of English language teaching in Turkey failed to yield the intended outcomes due to the top-down processes applied in decision making, extra work on teachers', their following the course-book rather than the teaching program, failures in teacher education,

grammar based language teaching, and other common reasons. It is also seen that introjected regulation is the major drive for teachers in the task of teaching. This might stem from the value given to students by teachers. Although introjected regulation is characterized to come out due to the pressure or feeling of guilt, it also has aspects stemming from internalized, self-controlled actions to preserve self-worth (Deci & Ryan, 2008). In this respect, Turkish EFL teachers value the task of teaching and evaluation of students compared to class preparation where they are not actually controlled by external sources. Since Turkey has an exam-oriented education system (Sagun, Ateskan, & Onur, 2016) through which the students are placed into secondary schools, high-schools, and universities, teachers pay special attention to student evaluation as they are the actual indicators for teacher success in schools by both all parties within the education system. Thus, intrinsic motivations of teachers significantly surpassed other motivational constructs.

EFL teachers' age is a rather neglected variable in terms of its impact on their motivation. The findings in this study indicated that the younger the EFL teachers, the more extrinsically motivated or amotivated they are for classroom preparation. Considering the average age of teachers in Turkey (36 years old), which is lower compared to other OECD countries (44 years old) (OECD, 2019), and almost over 63% of the total Turkish teachers aged below 40 (Ministry of National Education, 2020), it becomes apparent that the majority of the EFL teachers may be at risk of losing spontaneous curiosity, tendency, or interest toward classroom preparation before their classes due to the lack of intrinsic motivation (Ryan & Deci, 2019). The case being so in classroom preparation task notwithstanding, the results indicated younger (especially 21-25-year-olds) EFL teachers were significantly more intrinsically motivated for the tasks of teaching and evaluation of students. Therefore, despite lacking intentionality in classroom preparation by indicating high amotivation that may stem from lack of competence, value, or interest to perform; younger EFL teachers consider teaching and evaluation of students as curiosity spawned activities which are not dependent on external incentives by showing high intrinsic motivation towards these tasks (Ryan & Deci, 2020).

Moreover, teachers' salary has also been reported as a factor affecting EFL teachers' motivation (İpek & Kanatlar, 2018). The starting annual salary of Turkish teachers for all levels of education was 29407 USD (in equivalent USD converted using purchasing power parity for private consumption) in 2019, which changes according to levels of education in OECD average (OECD, 2020). However, the teachers' starting salary in OECD average was 8% (pre-primary) to 25% (upper-secondary) higher than that of Turkish teachers. What is more, although Turkish teachers' salary increase is limited to 12% from start to top of the scale, it ranges from 64% to 68% in OECD average depending on the level of education (OECD, 2020). Therefore, considering these data, both low income in the beginning of their career and lack of opportunity to increase it

later in their career may be a demotivating factor for young Turkish EFL teachers.

Regarding gender, the female EFL teachers seemed to perform classroom preparation and teaching tasks for several reasons, such as avoiding the feelings of anxiety or guilt (introjected regulation), being appraised, receiving a reward, or avoiding negative consequences like reprimand (external regulation) (Fernet et al., 2017). However, they seemed to have higher inherent pleasure and satisfaction (intrinsic motivation) towards evaluation of students (Fernet et al., 2016). In contrast to the findings of the present research, no differences based on gender variable was found in the study by Wanakacha, Aloka, and Nyaswa (2018) investigating Kenyan secondary school teachers or the research conducted by Wahab, Idha, and Halim (2020) investigating Malaysian teachers' motivation based on gender differences. However, the study by Triyanto (2016), examining motivations of Indonesian junior high school teachers, showed that male teachers had considerably higher motivation for teaching. The interviews indicated the fact that female teachers' motivation to work as a teacher was lower since they considered teaching career as a way to help their husbands in their families to have better economic conditions. Therefore, more in-depth data is needed for the present study to identify potential reasons of both genders' high and low levels of motivations for different work tasks.

Turkish EFL teachers' motivation across different work tasks also varied according to the area of the school located. For classroom preparation, the teachers working in city centers showed higher identified regulation indicating that they get prepared for their classes because it was congruent with their own values and goals. In general, the more modern the area of the school, the higher motivation the teachers reported for classroom preparation. On the other hand, for the tasks of teaching and evaluation of students, the EFL teachers working in rural areas seemed to be more intrinsically motivated than the ones working in city centers. Besides, the teachers working in city centers showed higher amotivation, which may possibly play the role of a negative predictor for wellness, engagement, and learning (Ryan & Deci, 2020).

The participant EFL teachers' motivation showed variations across seven geographical regions in Turkey as well. Initially, it should be stated that Turkey is a geographically large country exhibiting various landscapes and human characteristics in its seven regions. The results indicated that teachers working in Black Sea Region were found to be the teachers with the lowest intrinsic motivation, while the ones in Central Anatolia Region reported higher intrinsic motivation for classroom preparation and teaching. Moreover, the EFL teachers working in Eastern Anatolia Region showed a high level of amotivation for classroom preparation task. The regions in which EFL teachers reported higher amotivation and the lowest intrinsic motivation have low (Eastern Anatolia) and middle-low (Black Sea Region) income levels and high illiteracy and schooling rates (Ministry of Development, 2014). In addition, these two regions were

among the lowest scoring three regions in Turkey in English proficiency index (Education First, 2019). The low intrinsic motivation and the high amotivation scores of the EFL teachers in these regions may be a reflection of several different negatively associated data gathered from these two regions.

The last variable to be discussed is school type. The immediately apparent finding indicating relatively higher amotivation towards classroom preparation of the EFL teachers working in primary, secondary, and high schools compared to public education centers and other school types showed that putting an extra effort for the task of classroom preparation does not seem plausible for these teachers since the curriculum is offered in a top-down manner and materials (course-books) are provided by the MoNE. On the other hand, intrinsic motivation of the EFL teachers working in public education centers, where the teachers design their own materials and do not follow a certain course-book, which is also possible on demand though, was significantly higher. Therefore, EFL teachers working in public schools become less autonomous and demonstrate higher amotivation on classroom preparation task since a certain course-book and a syllabus to be followed are imposed.

In contrast to this finding, the EFL teachers working in primary schools demonstrated higher intrinsic motivation in the task of teaching, whereas they showed higher amotivation towards the task of evaluation of students. This may be due to the lack of evaluation process in primary school English classes.

Conclusion

The present study attempted to investigate Turkish EFL teachers' motivation for different work tasks with regard to various demographic data. In general, the results indicated significant changes in EFL teachers' motivations in three different work tasks, i.e. classroom preparation, teaching, and evaluation of students.

First, the findings showed that the EFL teachers demonstrated high amotivation towards classroom preparation, high-introjected regulation towards teaching, and high intrinsic motivation towards evaluation of students. Second, the findings regarding gender-based differences between the EFL teachers showed that the female teachers had higher amotivation or external regulation towards classroom preparation and teaching, whereas they demonstrated higher intrinsic motivation towards evaluation of students.

Another major conclusion is that the younger the EFL teachers, the more amotivated they were for classroom preparation. Nevertheless, the younger group of EFL teachers were found to be more intrinsically motivated towards teaching and evaluation of students compared to older groups.

The findings regarding school area showed that EFL teachers' motivation was more self-regulated for classroom preparation in city centers, whereas it is vice versa for teaching task. Moreover, in terms of evaluation of students, EFL teachers working in primary, secondary, and high schools where all the decisions

are taken by the MoNE, demonstrated higher intrinsic motivation. The findings concerning geographical regions showed that the EFL teachers working in Black Sea Region showed the lowest intrinsic motivation towards classroom preparation and evaluation of students.

Lastly, although the number of participants is quite high, quantitative data as the main source of findings stands as the major limitation of this study. Since interviews and diaries may provide richer data in terms of teachers' reasons for different work tasks, further research may conduct more in-depth investigations of potential reasons indicating why EFL teachers' motivation varies according to different work tasks.

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Digital Technologies and Their Application in a Child's Life

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Abstract:
Introduction: This research aims to examine pedagogically significant applications of digital technologies and attempt to identify certain principles of educational influence in pre-primary education. A qualitative methodology was used for this purpose.
Methods: The research is focused on in-depth interpretive analysis and identification of the meanings of the use of digital technologies for didactic purposes from a pedagogical point of view. The research was conducted in a kindergarten in Šaľa, Slovakia; the research group consisted of 12 children aged 5-6 years and 10 parents of children of preschool age from 3 to 6 years.
Results: The results have shown that through the constant comparative strategy and the sampling of extreme and similar cases we were able to analyse particular occurrences and mutual connections between them as interpreted by children and parents.
Discussion: We know that there are disagreements and conflicts between parents and children in the area of using digital technologies by children. In the application of digital technologies, we see not only a typical feature of contemporary society´s behaviour (communicating, presenting, etc.) but also certain support of development-forming aspects of children's personalities.
Limitations: The research was conducted during the COVID-19 pandemic when the kindergartens were attended by a limited number of children. The interviews with parents were carried out online without a closer social contact.
Conclusion: We identified identical and non-identical categories in opinions between children and parents relating to the use of digital

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technologies by children. We discovered that parental educational principles related to the use of digital technologies are opinion-determined.

Key words: preschool children, parents, digital technologies and their use, unifying education, educational perspectives.

Introduction

Digital technologies are an inseparable part of contemporary children's lives. Children participating in preschool education use digital technologies daily not only as part of the educational process but also at home; they are also regularly used by their parents as a normal part of family life. The learning activity of a child is not solely dependent on a teacher. Whatever a teacher may do during teaching, his/her activities and communication are influenced by an intervening variable – the child and his/her individuality (Mešková, 2012). To be able to communicate their experience and knowledge to others, children must be accepted by their teachers as equal partners; this way we (as teachers) enable their personal development and allow them to become open to new knowledge. What it means is that we enable children to make mistakes, to have doubts and dilemmas, but on the other hand, to construct acceptable explanations from their perspective of understanding (Tóthová, Kostrub, & Ferková, 2017), to acquire knowledge from sources while verifying it critically, to ponder it, to validate their sources and to join individual pieces to form a meaningful whole. To be able to learn all this, a person must do it independently (Spitzer, 2014). Knowledge is of an intersubjective character and is constructed by a child in the realm of the social world in which the child is living (Štech, 1992). As a mental base of human behaviour and the person's (child's) relationship to the world, knowledge is a network of convictions, meanings, beliefs, and attitudes (Kolláriková et al., 1997). Teaching should contribute to a qualitative change in the understanding of various occurrences. It should not offer ready-made knowledge but rather activate constructive processes in the child's mind. According to the constructivist model of teaching, the education should be designed to allow each child to construct his/her knowledge, "to create it as a protagonist who utilises all the previous knowledge and experiences (Tóthová, 2014). An educational activity (and its overall context) is a private matter of a teaching/learning group (children/pupils/students and their teacher); it excludes the possibility to be prepared ("dictated") in advance by someone other than the concerned - children/pupils/students and the teacher (Kostrub, Severini, & Rehúš, 2012). Even if a child performs an individual activity, an emphasis must be placed on mutual social interactions while we must not forget the risk of neglecting the child's individuality (individual processes of cognitive change). Children learn better if the process is interactive and rich in various contexts. This helps to stimulate discussions between children, to develop children's

understanding of (and "penetration" into) human intentions, and through it, into various interpretations of activities induced by a certain occurrence (Kostrub, 2008). This interpretation of knowledge and learning quite naturally includes the category of critical thinking (Kolláriková et al., 1997). According to the authors Paul and Elder (2010, as cited in Kosturková & Ferencová, 2019), a cultivated critical thinker has the following features: he/she poses essential questions and problems and formulates them clearly and precisely; collects and evaluates relevant information; arrives at well-founded conclusions and solutions and tests them through appropriate criteria and norms; thinks openly within alternative systems of thinking and based on a need, assesses assumptions and consequences; while solving complex issues, he/she communicates effectively with others. Sitná (2013) states that through an active approach to acquiring new information, children also effectively develop their critical thinking skills. These subjects utilise (mainly) their ability to identify important information and the ability (mainly) to find information in a (teaching) unit. A culturally literate child is (Kostrub et al., 2018): 1) A resourceful child – a child can adequately react to an intellectual challenge; accept a challenge, react to it in his/her typical style and use it to his/her advantage. He/she manifests an attitude of natural curiosity – wants to know the outcome of a situation, of his/her action, and also how the outcome is going to be accepted. A resourceful child has a sharp eye. 2) A prepared child – a child that successfully manages and controls a particular situation. He/she can face it in an expected and acceptable manner. He/she manifests an attitude of natural interest in an activity and is target-oriented. 3) A self-sufficient child – a child that acts independently (with minimal or no outside help) based on his/her judgement and bears adequate responsibility for his/her actions. He/she manifests an attitude of natural vigour. 4) A cooperating child – a child that can make social contact with others, maintain it, change it or finish it. He/she manifests an attitude of natural social inclination and enjoys doing activities with others, getting results from common activities, and appreciates the feeling of shared joy. A competent child is a child proceeding on at least three levels: a) on the level of his/her development, b) on the level of the educational process, c) on the everyday-life level (in situations life brings). A competent child is a child that can manage various situations. Those familiar with the issue agree with the statements of contemporary educators and psychologists: what children learn in class depends on what they know already (Kasíková, 1997). Everything a child acquires, knows, does, and uses in this stage of life influences his/her successes and failures in further life stages (Uváčková, Valachová, Lehotayová, Leginusová, & Bruteničová, 2012). We embrace the idea that digital technologies belong in children's hands as they provide them with unique opportunities for new, up-to-date, and attractive learning, opportunities to search for, communicate and explore big ideas (Kalaš et al., 2013), they are a part of everyday life of preschool children and often make life easier, enhance communication with family and friends (Holloway, Green, & Stevenson, 2015).

"Digital media" and "technologies" are considered inclusive terms, reflecting a scale of sources available in early education (Plowman, 2016, as cited in Arnott, 2017). Their inclusion in children's everyday life and learning has changed the understanding and thinking about childhood (Arnott, 2017). Murcia, Campbell and Aranda (2018) claim that digital technologies can include social media, online games and applications, multimedia, applications for productivity enhancement, cloud computing, interoperable systems, and mobile devices. Digital learning is also defined as any type of learning that is facilitated by technology or by instructional practice that effectively employs technologies. Digital learning appears in all learning spheres and domains. It incorporates a wide spectrum of procedures including mixed and virtual learning, game learning, access to digital content, cooperation on a local and global level, sending messages, active participation in online communities with the help of technologies, cooperation, creation and management of online environments (e.g. Severini, Kožík Lehotayová, & Csandová, 2020; Jančaříková & Severini, 2020). It was Papert who started thinking about children, not teachers. He pointed out that a computer is not the teacher's tool; it is the child's tool (Kalaš et al., 2013). The application of digital technologies starts in childhood, from an early age; this fact is interpreted by some scientific studies (Kotilainen, Suoninen, Walamies, & Tuominen, 2011). It seems that parents' activities and their relationship to media influence subsequent activities of their child (Kotilainen, Suoninen, Walamies, & Tuominen, 2011). Children's interest in digital technologies is considered crucial (Undheim & Jernes, 2020); we consider teachers' erudition in the area of digital technologies that enter the teaching process equally important. Learning is an activity seeking a balance between developing the structure of the mind and newly arriving knowledge based on a lasting principle. The mind's content is inherent in the beginning but over time, through different mechanisms, it adjusts to the environment and various external influences the child is trying to understand. According to J. Piaget, knowledge cannot be transferred onto children. Parents and teachers can, however, aid the creation of conditions and situations when children construct pieces of knowledge themselves and actively integrate them into their system of knowledge (Kalaš et al., 2013). The presence of technologies in all aspects of our lives can be connected with changes when it comes to how we construct and share knowledge (Arnott, 2017). Digital technologies offer many opportunities for formal, non-formal, and informal learning and thus create a productive environment and copious opportunities for the learning process (Kalaš et al., 2013). An exceptional critical moment is the child's/children's powerlessness during digital technologies malfunctioning, which contradicts the claim that contemporary children are labelled digital natives (Tóthová, Kostrub, & Ferková, 2017). Only a few scientific studies deal with the risks and benefits of using digital technologies by preschool children. Current recommendations related to the use of digital technologies, based on the passive use of digital

technologies, which state that the time spent at the screen is harmful, are at odds with the advice of educational experts and application developers who view the interactive time spent at the screen as engaging and educational (early childhood educational guidelines support the development of skills in the area of digital literacy) (Holloway, Green, & Stevenson, 2015). What we see as the key prerequisite for acquiring the skill of critical use of digital technologies is the development of digital literacy. Kalaš et al. (2013) characterize digital literacy as a collection of knowledge and understanding necessary for reasonable, safe, and productive use of digital technologies for learning either at work or in everyday life. It is a set of skills that incorporates: meaningful and creative use of various digital tools for own needs, learning, self-expression, and own complex personal development; effective solution of tasks and problems in the digital environment; qualified choice and ability to use appropriate digital technology to find information, process, use, share or create this information; critical assessment and analysis of knowledge acquired from digital sources; understanding the social consequences (including safety, privacy protection, and ethics) occurring in the digital world; appreciating and having the need to continually develop these skills and learn more. Interacting with digital sources suggests that a game should be the central part of their use (Arnott, 2017). As a result, the implementation of digital tools and toys should not be compared with established toys; such comparisons, therefore, often devalue digital toys, labelling them as too individualistic, lacking creativity, and inducing no motor reactions. He claims that the digital game should be considered in a wider context from the cultural aspect; that is to consider how technologies connect children with contemporary society. The implementation of digital tools creates new types of games with their new opportunities and needs for development, which must be assessed individually and not necessarily as being of lower quality when compared to more familiar toys. For example, Murcia, Campbell & Aranda (2018) mention that an initiative of the Australian government instigated a reform of the educational system and encouraged educators to see opportunities in the fact that digital technologies can support active learning and improve the teaching process itself. Kostrub, Severini and Rehúš (2012) state that being active is justified when it enables the learner to overtake the active role (the apply his/her activity): to search, explain, observe, start discussions, participate in simulations, etc. and not when the learner is supposed to listen, fill worksheets or get engaged in routine discussions with the teacher. We must support the need for critical reflection on the use of digital technologies by children.

1 Methodology

The aim of this qualitative research is to discover and develop a theory, which arises from the research context and not from deductive processes supported by the verification of the initial theoretical framework. Based on this idea, we constructed a design of the qualitative research (e.g. Kostrub, 2016; Severini & Kostrub, 2018). The decision to conduct qualitative research is not self-serving but is determined by the focus of our research, i.e. parents and children and their opinions. We examined the structures of meaning related to digital technologies and their role in children's lives, which the participants of our research actively create, communicate, and are also disposed to describe and explain. Qualitative research enables us to ponder human behaviour from the perspective of the protagonist or more precisely, from the internal (subjective) reality, the reality we are aware of and experience. The research aims are: to identify children's and parents' opinions related to the use of digital technologies for children's education; to study and interpret views of the educational process in connection to digital technologies from the perspective of our research participants; to determine the presence of educational principles in the use of digital technologies by our participants. These aims are derived from the known educational reality.

1.1 Participants

The research group consists of 22 participants from the Slovak kindergarten – twelve children, one child aged five, eleven children aged 6, and ten parents: four mothers of children aged 3, two mothers of children aged 4, two mothers of children aged 5, one mother of a child aged 6, and one father of a child aged 3.
All participants had been asked to participate in the research in advance, and they manifested their willingness to be part of it. The participants had been assured that all rights related to maintaining anonymity in connection with the ethics of the research would be followed. The parents of children participating in the research had been acquainted with the research objectives and agreed with their children's inclusion in the research sample.

1.2 Research problems

While formulating the research problem, we derive from the observed reality that there are inconsistencies in parents' and children's actions related to the use of digital technologies; confrontations are initiated as well as lengthy discussions, orders, and restrictions related to the use of digital technologies by children are imposed. There is an evident lack of harmony, parents impose restrictions on the use of digital technologies by children, children demand (often forcefully) the use of digital technologies; parents sometimes force children to use digital technologies. The backdrop of these externally visible and perceived manifestations and it is, therefore, difficult to judge the correctness, appropriateness (justification), or meaningfulness of this behaviour. We need to

know the background of such behaviour mainly to understand and accept it but also to use it in the ongoing or follow-up educational activity.

1.3 Research objectives

In collaboration with participants, to detect and interpret the role digital technologies play in the lives of participants. What is behind their decisions in situations in which digital technologies are used? The reason we conduct the research is to identify various perspectives of seeing the application of digital technologies by these two groups of participants; to find out if (how or why) they are identical or contradictory. The research objectives are to identify the potential of the child in connection with the use of digital technologies in the educational process in the socio-constructionist model of teaching, conceptualize the pedagogical aspect of the application of digital technologies and clarify more efficient use of digital technologies in pre-primary education.

1.4 Research questions

In our research we stated the following research questions:
RQ1 Which digital technologies do our research participants (children) have at their disposal?
RQ2 What role does digital technologies play in our participant's (children and parents) lives?
RQ3 How do participants (children and parents) use digital technologies in the educational process?
RQ4 Is it possible to identify any educational principles in the use of digital technologies by research participants (parents)?

1.5 Data collection

To get detailed information related to identifying children's and parents' opinions related to the use of digital technologies for children's education, the data were collected via unstructured and semi-structured interviews and the focus group, unstructured observation, participatory observation, non-participatory, direct, and indirect observation. For the unstructured interview, open-ended questions were asked while reacting to the interview's progress. Questions were not prepared in advance. For the semi-structured interview, a content framework and areas of questioning were prepared, but they were adjusted to the interview's progress. The discussion in the focus group was moderated by the researcher. The group interaction was used to acquire data related to the topic along with the participants' views, which would not be as accessible outside the group.
Interviews with parents took place online through digital communication technologies, Facebook, Messenger as a result of the world situation related to the COVID-19 pandemic. The interviews were recorded using a dictaphone. Discussions were held several times as we wanted to make sure our

understanding of the stated ideas was correct. During the analysis of the research material, individual categories were gradually formed and their saturation was increasing. Step by step, a unified picture started to appear, based on which we were able to draft a conceptual map and subsequently construct our interpretation.

The interpretations obtained from the participants were transcribed into a text form, we worked with the transcript, which we analysed, examined, and compared the individual data. The data were categorized into groups - categories that are created based on common properties or characteristics. The categories were merged or developed as needed and marked with codes for easier orientation. An interpretation of the findings was created based on the interconnectivity of individual categories as well as conceptual maps.

2 Findings

Based on the research material and the analysed data we formulated 15 primary categories:

1. A tool for personal help;
2. Knowing and using the functions of digital technologies;
3. A tool for the child's entertainment;
4. A communication tool;
5. A tool for learning and teaching;
6. A tool for finding directions;
7. A tool for acquiring information;
8. A tool for exploration;
9. A tool for technological progress;
10. A tool for preserving the past with the possibility of return;
11. A tool for self-presentation;
12. A tool for securing reassurance;
13. The safety of use;
14. The external regulation of the use of digital technologies;
15. The external explanation of the media content.

In this part, we present the findings of the research by identifying *identical* opinions of children and parents (Figure1) related to the use of digital technologies in education. In the category A tool for learning and teaching (NU), children interpreted the topic as follows: "… *we are learning.", "Well, because it helps me with English.", "When we were working on the computer, I put there a circle and a square and that's what we were learning..."* They see the use of digital technologies and similar tools as the support of learning and teaching. Parents consider digital technologies a common part of children's lives and a tool for learning that leads children to acquire new knowledge: "… *and from that, she learned a lot of English.", "And she learns it spontaneously*." In addition, what parents see as important is to search for content that helps children acquire new competencies and knowledge: *"It leads them toward*

independence.", "When she wants to watch something I find something where she can find some … ", "… so the child can watch programs that would educate."

The category A tool for acquiring information (NI) helps us to see digital technologies as a tool for exchanging experiences and other information (textual or pictorial) that the children consider important: *"For example, to look for information, what you want to know.",* "*And you look at a watch when you want to know what time it is …",* "*Or mum finds there what she wants to cook, how to make it, what goes in and then she makes it."* Parents see digital technologies as a valuable tool for acquiring information for children and thus help them to progress. At the same time, they see digital technologies as a great accessory to their educational influence when they claim that digital technologies provide children with richer content than they would be able to offer alone: *"… there are definitely some intelligent applications or games or whatever that may help with progress …", "It is surely richer than what I would be able to give.", "In my view, it is clearly beneficial from this point of view."*

Children see progress in digital technologies as an ongoing improvement of already used machines and objects from their surroundings: *"… for improving transportation and electronic systems in cars.", "When something is invented, they improve it."* It is integrated into the category A tool for technological advancement (NTP). Parents, on the other hand, see progress in digital technologies as a possibility for children to acquire necessary information much faster than before and thus progress much faster than in the past. They see great potential in what digital technologies can bring their children: *"And the progress is very fast and is picking up speed …", "Well, I believe that taking advantage of the potential is the duty of our generation in order for children to develop the potential…", "There is potential in this direction too and we need to take advantage of it…", "human science and research and evolution and human intelligence, in general, are quickly developing, at a really high speed."*

Children see activities connected with the use of digital technologies as entertaining, and they often solve really complex problems, which is most entertaining. This is included in the category A tool for child's entertainment (NZ) which they interpret: *"If I'm bored and my mum does not allow me to use the tablet, I take my phone, I only have a few games there but I enjoy them… " "That you have it with you and you use it for playing."* They use digital technologies to relax, entertain themselves and while doing so, they feel joyous. We claim that the most effective learning occurs when we enjoy what we are doing at the moment. Parents interpret digital technologies as a tool for their child's entertainment the following way: *"Only to a small extent as a form of entertainment.", "It is for him something like joy, entertainment from time to time.", "She also has games on the tablet…", "She enjoys listening to it."* Parents see the use of digital technologies as a sort of substitute for parental

attention: *"… the easiest application is to use it as a babysitter, that the child sits with it and you can do your own thing."* The majority of parents see this as a negative feature and do not use digital technologies for this purpose: *"… for example, some children watch YouTube on their phones so that the parents can be free…", "Because the reason is that parents get rid of children for a while. He/she wants to have peace and quiet and simply gives the child a mobile."*
The use of digital technologies brings not only positives but has some risks as well. Children are aware of the risks and talk about them in the category The safety of use (BV): *"But they are not always good for us. When we use them for too long, we can have a headache. Or our eyes can get damaged."* What parents see as risky are mainly the changes of behaviour caused by watching inappropriate content, by the desire to repeatedly escape into a virtual world and they also see danger in the prolonged sitting, which may lead to physical consequences: *"If she watches something inappropriate, she has strong manifestations …", " … then she behaves terribly.", "At the same time, I see it as an escape into a virtual world…", "it offers these children a huge space where they start living parallel lives, fictitious, virtual lives and it scares me.", "… then it results in various behavioural disorders", "… not only did she damage her back or her wrist…"*

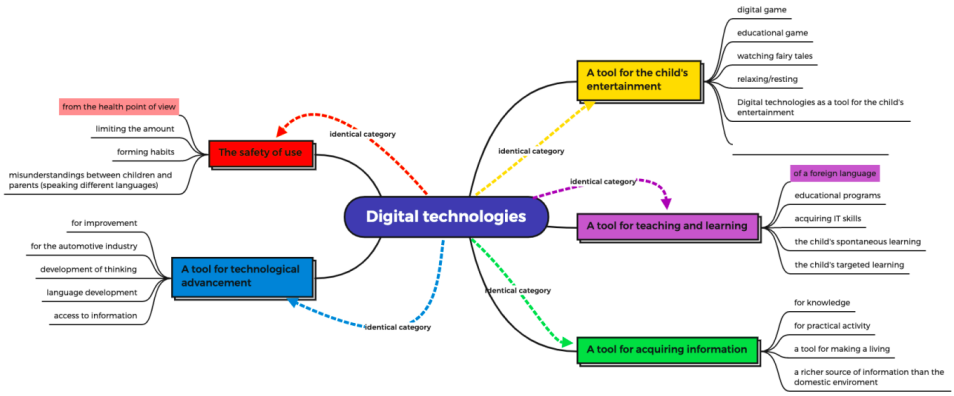

Figure 1. The conceptual map with identical categories and subcategories.

A tool for personal help (NOP) is among the non-identical opinion interpretations that were collected from children but not from parents (Figure 2). This proves the fact that digital technologies are used for personal benefit in everyday situations. Children explain the specific qualities of digital technologies: *"It serves me in a way that I have a bracelet and there I have the house number in case I forget, the telephone number, also I have the house number there …", "To call my daddy if something happens to me at the playground…"* Children were aware of the usefulness of digital technologies,

they understand their functions (PVFDT) and describe them as follows: *"When you have digital technologies such as a notebook, you can put photos there, then you place it on the desktop, send it somewhere, I do not know where it is sent and then they send it to your house and you have photos."* Digital technologies have changed the way we communicate, and children communicate with loved ones through various channels. Face-to-face communication was replaced by long-distance communication – it is accessible, effective, reliable, and commonly used by children. It is identified through the category A communication tool (NK). "*Because, for example, it is shown, but the photo is still there and* I *can still make a call.", "Or, on the phone, I can send a message that I had, for example…"* Orientation in an unknown environment and finding directions is facilitated by digital technologies as A tool for finding directions (NUO): "*And I also have there a car finder, that I type a name in there and it's a car finder and it will show where mum and dad are.", "We are looking for the way to a place we have never been to, so it will show us in the car which way we should go." When needed, these types of tools are commonly used. Digital technologies also provide users with more freedom, autonomy, and opportunities to explore something new while it leads to a more effective solution of problems: "…those applications where you click, it opens, and you know what type of mushroom it is. You point at the mushroom and it shows you if you can eat it. But it's not written, it only shows you a picture."* It is part of the category A tool for exploration (NS). Going back in time and restoring memories through digital technologies is another application the children are aware of: *"For recording videos when we are on a holiday so we would know where we had been, what we did there.", "In such a way that when you have those digital technologies such as a notebook, you put photos there …"* This application of digital technologies forms the category A tool for preserving the past with the possibility of return (NUM). Digital technologies can also be used as A tool for self-presentation (NSP) where a child acquires a view of oneself, space, and the ability to think of oneself, to "look" at oneself with someone else's eyes. "*And when he wants, he records his songs on the guitar and plays them back to me or mum and then puts them into the computer and on the Internet so others can hear them too."* Digital technologies are also A tool for securing reassurance (NZU) where the human need for assurance is fulfilled: *"… then my mum put there (into a watch) the house number, the phone number, the police number 112. Then she put mum and dad's numbers there, the whole family… "*

We see digital-generation children as very pragmatic and practical individuals who are aware of the capabilities of digital technologies and who use them not only for entertainment and fulfilment of their own needs but also as a tool of personal help, communication, learning, teaching, finding directions, acquiring information, exploring, preserving the past with the possibility of return, self-presenting and acquiring assurance.

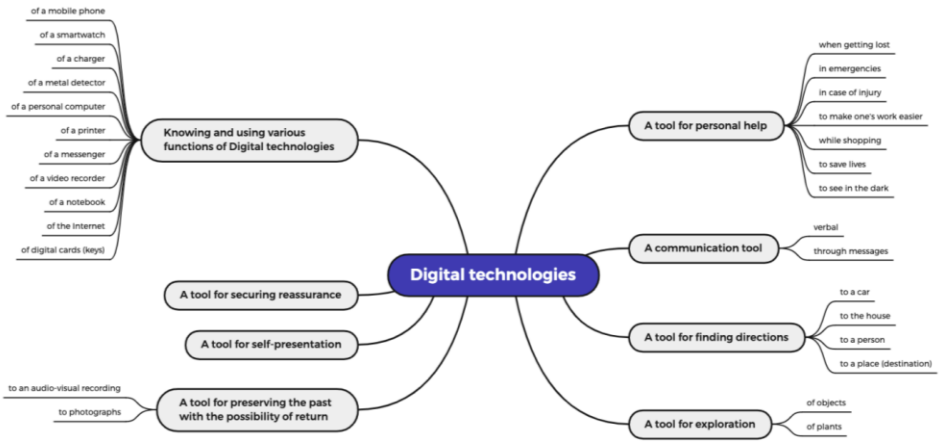

Figure 2. The conceptual map with categories and subcategories collected only from children.

The study also contains categories representing parents' opinions that are not identical with the opinions of children (Figure 3). The first non-identical category is the External regulation of the use of digital technologies (ER). Here, parents see it as necessary to regulate the following parameters. The content: *"To watch out for what he watches.", "But he only watches programs for children.", "To have it under control, what the child watches there." The length of the content consumption: "I tell him, you have an hour for this…", "…at the same time it must be rationed." The time when a child may use digital technologies: "Not now, now is not the time for TV.", "…when the time is right. So, not before sleep…"*
Parents believe that answering children's questions while they consume digital content is important, the same applies to explaining (and further explaining) the content (EZ): *"…we explain to her what is going on there, why something has happened.", "Now, she herself has questions and asks. Why this and what does this mean and we are there and we explain right away so she understands everything correctly…", "We are with her, we explain and further explain…".*

Figure 3. The conceptual map with categories and subcategories collected only from parents.

The frequency of occurrence is recorded in the following tables (Table 1, Table 2) containing particular categories, the order of occurrence, individual codes, and the recorded frequency:

Table 1

Frequency of occurrence

Order of occurrence	*Category*	*Code*	*Frequency of occurrence*
1.	Knowing and using the functions of digital technologies	PVFDT	18
1.	A tool for personal help	NOP	18
2.	A tool for the child's entertainment	NZ	15
3.	A communication tool	NK	7
4.	A tool for finding directions	NUO	6
5.	A tool for learning and teaching	NU	5
6.	A tool for acquiring information	NI	3
7.	A tool for exploration	NS	2
7.	A technological advancement tool	NTP	2
7.	A tool for preserving the past with the possibility	NUM	2
8.	A tool for self-presentation	NSP	1
8.	A tool for securing reassurance	NZU	1
8.	The safety of use	BV	1

Table 2

Frequency of occurrence

Order of occurrence	*Category*	*Code*	*Frequency of occurrence*
1.	External regulation of the use of digital technologies	RE	18
2.	A tool for the child's learning and teaching	NU	15
3.	A technological advancement tool	NT	7
4.	A tool for the child's entertainment	NZ	6
4.	The safety of use	BV	6
5.	A tool for acquiring information	NI	5
6.	External explanation of the media content	EZ	3

3 Discussion

Based on the research, we found identical categories between parents and children, among which several categories were identified, such as digital technologies as a tool for children's entertainment, digital technologies as an

educational tool, a tool for acquiring information, a tool for technical progress or the safety of use. In the description of the educational reality, a full understanding has been observed, which means that a parent is aware of the reason why to offer a child a digital technology tool, and the child is aware of the reason why he/she wants it. In other words, for example, the child is entertaining himself/herself and the parent is fully aware that in that particular time the child uses digital technologies for entertainment. But, according to the identical categories, the parent is also able to distinguish between mere entertainment and a process of education. The child does not manifest resentment if his/her opinion matches that of the parent and vice versa. We see it as pedagogically justifiable to know parents' opinions of children's use of digital technologies while we consider understanding children's opinion of their own usage of digital technologies in different parts of the day, various situations, and activities equally important. Through the application of digital technologies, a part of life opens for the child that has a contemporary-cultural as well as a personality-updating character. Parents considered it necessary to regulate the length of time when children consume the content of digital technologies and to explain and further explain the content. Both children and parents view digital technologies as a tool for the child's learning but parents also use them as a sort of substitute for parental attention. To a certain extent, they also see the use of digital technologies by children as a threat; this fact was mentioned by one of the children as well. Children recognize digital technologies as a normal part of everyday life and are aware of their effective utilisation not only as a source of entertainment but mainly as a tool for solving problems and for personal help. Unlike parents, children do not consider digital technologies expressly harmful or dangerous, what they mostly talk about are the possibilities of their effective use. For children, digital technologies are a communication tool (through voice or messages), a tool for finding directions to a car, home, to a person or place (destination), for learning and teaching foreign languages through available educational programs, a tool for acquiring information to extend their knowledge but also to find instructions for practical activities, a tool for exploring objects or plants, for preserving the past with the possibility of a return to audio-visual recordings or photographs, for self-presentation, for technological progress in the automotive industry and overall improvement.

We determined the following educational principles that parents actively apply during their educational influence related to the children's use of digital technologies: the principle of systematic behaviour is applied by participants mainly for the purpose of children's education. We encountered repeated and targeted playing of educational programmes for children or music videos to help children develop certain skills, for example, math or improve foreign language fluency. Parents also repeatedly employed the principle of activity when they encouraged children to use digital technologies, for example, to sing along with professional singers, to repeat foreign language words (mainly in English) but

this way, they also encourage children to use digital technologies independently and thus become their active users. The demonstrative principle is used by parents when they want to demonstrate to children how to use digital technologies in a suitable way; they become exemplary users of digital technologies. Parents are aware of being imitated by their children and that this applies to digital technologies as well; parents consciously work with this knowledge. We believe that this finding determines and conditions parents' overall behaviour. One of the most discussed and applied educational principle was the principle of reasoning when the form and content of digital technologies play an important role. Parents take into consideration the developmental and individual features of their children and use digital technologies appropriate to that knowledge. At the same time, parents see digital technologies as an important technological advancement tool and they want their children to be in everyday contact with digital technologies as they realise their importance for contemporary life. Children, on the other hand, look at digital technologies as a tool for technological advancement through which the world improves and progresses. Parents, however, are also worried about all possible risks of digital technologies including physical and psychological consequences. We were surprised by a bifurcated stratification of opinions in the category A tool for entertaining the child when in some cases, parents considered it suitable to use digital technologies as a substitute for parental attention. They use digital technologies as a sort of babysitter when they do not have enough time or space to pay attention to their children. Contrary to that, the majority of parents are against using digital technologies to entertain children in this way and consciously do not use digital technologies for this purpose.

What we consider vital is the parents' deeper understanding of the role of digital technologies and the fact that they want to understand why children are interested in digital technologies (when it comes to the content as well as the extent of their use). Another thing we appreciate is the mutual discussion preceding the formulation of rules and the explanation of the content that led to greater consistency of parents' and children's interpretations. There are also agreements between children and parents related to the use of digital technologies which subsequently result in a more meaningful utilisation of digital technologies by children. It was found that children's application of digital technologies also depends on what they learn from their parents; children observe parents' attitudes towards digital technologies. Parents need to consciously set themselves rules when it comes to using digital technologies, discuss the possibilities of using digital technologies with children, participate in mutual educational programs with children and see digital technologies as being a part of everyday life (including children's lives). Children consider digital technologies an important tool for creating social interactions with parents, peers, or relatives for feeling reassured about their closeness, and thus parents need to understand that digital technologies have become an inseparable part of

children's lives and that children see them as an important tool for communicating with each other as well as with parents.

What was an interesting finding for us was the children's naturalness in interpreting their use of digital technologies while referring to digital technologies as a tool for personal help when being lost, in case of an injury, for making one's work easier, while shopping, when saving lives, seeing in the dark or in emergencies. We aimed to fully describe and interpret the findings from material acquired from the field (Figure 4). Through reliability, credibility, and an audit, an assessment of the process and quality control of a cross character was conducted. We consider the results acquired through our research valuable mainly because we managed to identify relationships between the research phenomena and the individual categories. At the same time, thanks to the process of their acquiring and elaboration, we see them as methodologically transferable.

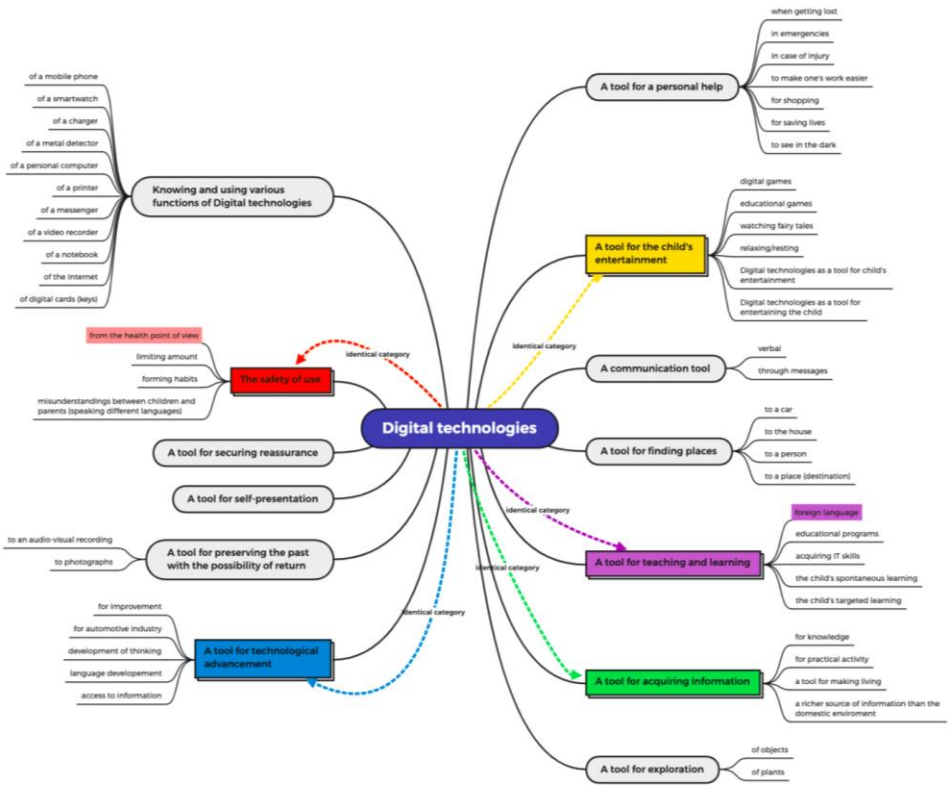

Figure 4. The conceptual map depicting all identified categories and subcategories occurring in the research.

What we found surprising was that during interviews when asked about digital technologies, children mentioned no digital games that were freely available as

part of the educational process in the kindergarten. According to them, digital technologies are a mobile phone, a TV, an iPhone, an MP4, an electric car, a digital watch, a smart-watch, a charger, a tablet, a metal detector, AirPods, GPS, a cash machine, a printer, a copier, a video recorder, a digital camera, digital cards, a scanner, a reader. They consider them "… something we use very often …" a product of human culture, co-creating the society and the lives of all people. As a result of our research and compliant with the opinions of participants, we see digital technologies as technical tools for learning and teaching and, at the same time, as a part of human culture - two equal and mutually interdependent factors, which are an integral part of the world's progress.

Conclusion

Our further research will focus on the creation of borders and maintaining limits related to the use of digital technologies by children in their domestic environment. We will concentrate on the application of concrete principles used at home in communicating with children participating in obligatory preschool education. In further research, we will create a conceptual map as a result of action research, by which we will gain an understanding of how the participant (child) constructs the "social reality" in the field of digital technologies. A complete meaningful picture will be created for us, which will be the result of a phenomenological type of qualitative research and in which the participant has integrated its own experience with the acquired knowledge and values of the given society. Its content will be a description of identified relationships, connections between them, and the researched phenomenon. We will conceive the findings into recommendations for pedagogical practice for teachers. Based on our research, we express the opinion that learning with digital technologies is more valuable than learning about digital technologies.

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Effects on Primary School Teacher Candidates of Developing and Implementing Jigsaw Technique Activities Enriched with Educational Games in Science and Technology Teaching Lessons

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Abstract:
Introduction: The aim of the study was to examine the effects on Primary School Teacher Candidates of developing and implementing jigsaw technique activities enriched with educational games in Science and Technology Teaching lessons.
Methods: In the study, the mixed design was used. The single group pre-test post-test weak experimental pattern from among quantitative research methods and a case study from among qualitative research methods were used. The study group consisted of 48 teacher candidates continuing their education at Istanbul University, in the Primary Education Department Classroom Teaching Program during the 2018-2019 academic year. In the Science and Technology II lessons the "Jigsaw technique enriched with educational games" was implemented. The "Communication Skills Scale" and the "Opinion Form Jigsaw Technique Enriched with Educational Games" (JTEEG) were used as data collection tools. The SPSS 16 program and the content analysis method were used for data analysis.
Results: When the quantitative data obtained from the study were examined, it was determined that there were statistically significant differences between the pre-test and post-test mean scores of the communication skills scale in favor of the post-test. Based on the qualitative findings of the study, teacher candidates stated opinions including the themes of "Positive Opinions", "Negative Opinions", and "Preferring the Technique "and" Suggestions for technique related changes". It was also observed that the majority of the teacher candidates indicated positive opinions.
Discussion: It is important that teacher candidates who will be educating students in the future develop their skill levels in order to improve the communication skills of their students. As can be understood from the results of the present study, JTEEG is effective in developing the communication skills of classroom teacher candidates. Also, it is very

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important that the classroom teachers who will teach a science lesson for the first time increase the interest of the class making sure that the students enjoy science. It can be put forth, based on the findings of the study that JTEEG is quite effective in making students like a science lesson and learn through enjoyment.

Limitations: There were several limitations to this study. The first limitation was that this research relied on only Primary School Teacher Candidates' data. The second limitation was the subject. The study was carried out only on the "Properties of Matter" unit. The third limitation was that the study data were only collected in Turkey, and so, the study results are only regionally generalizable.

Conclusion: In conclusion, it was observed as a result of the present study on the impacts of developing JTEEG related activities and implementing them that the technique used in this study resulted in an increase in the communication skill levels of teacher candidates. As can be understood from the results of the present study, JTEEG is effective in developing the communication skills of classroom teacher candidates. Hence, it can be suggested in the light of the findings of this study that education environments should be arranged based on JTEEG. Also, it can be stated, based on the statements of the teacher candidates, that they mostly have positive opinions on the implemented technique. Science lessons are among the lessons that students mostly approach with concern. The fact that it involves abstract concepts and that some of its subjects are perceived as difficult are among the reasons for this concern. Students get to take a science lesson for the first time in the 3rd grade. It is very important that the classroom teachers who will teach the science lesson for the first time increase the interest of the class by making sure that the students enjoy science. It can be put forth, based on the findings of the study, that JTEEG is quite effective in making children like the science lessons and learn through enjoyment, since it enables them to be more active, take responsibility while providing them with the opportunity to develop new games and activities, establish more communication with other students in addition to making abstract concepts more concrete. For this reason, it is very important that the techniques to be applied are learned and applied by the teacher candidates.

Key words: primary school teacher candidates, Jigsaw technique, educational games, science and technology teaching.

Introduction

Today, the importance of science education increases with the developments in science and technology. National and international societies are striving to improve the quality of their science education in order to adapt to advancements (Çepni, 2011). In general, recent educational reforms place importance on reflecting the concept of scientific literacy in the educational program. In this

regard, education programs aim to raise individuals who understand the relationship between science, technology and society, who can use the information they learn in solving the problems they encounter, and who have advanced questioning skills and communication skills. Raising science literate individuals with these characteristics puts forth the necessity of having a sufficient level of knowledge in science literacy along with sufficient experience in implementing the teaching methods and techniques for teachers who will teach the science lessons. Teachers' lack of knowledge and misconceptions about some science subjects (Atwood & Atwood, 1996; Çepni, Küçük, & Ayvacı, 2003) indicate the importance of teaching teacher candidates about Science and Technology Teaching.

The last science-related courses taken by Primary School teacher candidates are Science and Technology Teaching I-II. While the Science and Technology Teaching I lessons include the attributes of the scientific method, the aims of science teaching, the constructivist approach and science learning, scientific process skills and exemplary applications, Science and Technology Teaching II lessons include the development of sample activities on the basis of the science and technology teaching program using various teaching models, and traditional and alternative assessment and evaluation techniques (HEC, 2007-5). Primary School teacher candidates are considered to have sufficient proficiency to effectively apply the primary school science teaching program when they complete these lessons successfully. Hence, it is apparent that implementing the lessons effectively plays a vital role on learning. Even though students encounter science lessons for the first time in the preschool period, officially, the first science lessons are applied at the 3rd grade level of primary education. It will be possible for Primary School teachers, who will apply the primary school 3rd grade science lessons, to provide students with science literacy skills through the applied science and technology teaching lessons offered at the university. This can only be possible by implementing the active learning methods and techniques that place the students at the center. In the science curriculum (3rd-8th grade), emphasis is placed on conducting classes in learning environments where student-based active learning approaches, such as problem-based learning, project-based learning and collaborative learning methods are applied (MOE, 2018). For this purpose, it is very important that the Primary School teacher candidates, who will teach the 3rd and the 4th grade science lessons, have sufficient knowledge of active learning approaches and are able to implement them properly.

Cooperative learning, which is one of the active learning approaches, is defined as a learning process in which students in heterogeneous groups of 3-7 people help each other learn to achieve a common goal, engage in learning activities together and motivate the group's achievements with rewards (Slavin, 1980; Senemoğlu, 2010). It has been put forth by researchers, as a result of national and international studies, that the cooperative learning method enables

meaningful learning and the permanence of the acquired knowledge (Nakipoğlu, 2001), the development of critical thinking, team building, problem-solving skills (Henderson & Martin, 2002), approach the opinions of others with tolerance, making the learning and teaching environment more enjoyable (Senemoğlu, 2010), increasing academic success and motivation (Sharan, 1980; Senemoğlu, 2010), developing empathy skills (Cohen, 1986), learning to accept different opinions, increasing emotional communication between the students and developing communication skills (Abu Seileek, 2012; Bayrakçeken, Doymuş, & Doğan, 2015), increasing self-confidence (Slavin, 2014) and developing leadership skills (Ün Açıkgöz, 2008).

Cooperative learning methods are implemented through the use of many different techniques. Learning together (Johnson & Johnson, 1991), student teams-achievement divisions (Slavin, 1990), team-game tournament (DeVries & Edwards, 1974), group investigation (Sharan & Hertz-Lazarowitz, 1980) and jigsaw (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978) are among the most frequently used learning techniques.

The jigsaw method that was first implemented by Aronson et al. (1978) was used in the present study since it enables the development of positive relations between the individuals, active participation to the process during which the individuals are able to learn from each other and are able to use many social skills, such as communication skills (Bayrakçeken, Doymuş, & Doğan, 2015; Şimşek, 2007). The implementation process for the technique can be summarized as the formation of heterogeneous groups, formation of expert groups, each specialized in different subjects, with the participation of at least one member from the groups, the group members specializing in the expert groups returning back to their main groups to teach the subject to their friends in the group and ensuring that all subjects are learned by all class members through interaction, and finally, the assessment of group members. Each group member takes on the roles of both teacher and student in this technique (Turaçoğlu, 2009). Various changes have been made over time in the implementation of the Jigsaw technique and different forms of the technique have been developed. These are Jigsaw (Aronson et al., 1978), Jigsaw-II (Slavin, 1986), Jigsaw-III (Stahl, 1994), Jigsaw-IV (Holliday, 2000), Reverse Jigsaw (Hedeen, 2003) and Subject Jigsaw (Doymuş, 2007). Even though the basic principles of all jigsaw techniques are the same, there are small differences between them. These differences are having an exam at the end of the implementation process in Jigsaw-II technique to ensure competition in the group by rewarding successful students; assessment of the implementation process by way of standard forms in the Jigsaw-III technique; organizing an activity at the beginning of the Jigsaw IV technique to attract attention to the subject, and performing a mini-quiz at the end of all expert and main group activities; presentation of the specialized subject to all classrooms by expert groups in the Reverse Jigsaw technique, and

allowing for continuous transitions between the groups as well as individual assessments in the Subject Jigsaw technique.

The aim of the Jigsaw technique (Jigsaw, Jigsaw-II, Jigsaw-III, Jigsaw-IV, Reverse Jigsaw, Subject Jigsaw) as one of the cooperative learning methods is to increase academic success in addition to raising individuals with work ethic and discipline, who are then able to work in harmony with the group, who are respectful, have empathy skills, tolerance with increased communication skills and who are sensitive to their environments. It is considered that the Jigsaw technique encourages students to cooperate, thus minimizing competition in the learning environment, encouraging students to help each other rather than to compete with each other, enabling students to develop positive attitudes towards learning by themselves and learning from each other, developing positive relations between the group members in the class, in addition to improving self-confidence, learning and communication skills (Johnson & Johnson, 2005; Tran & Lewis, 2012).

It has been determined, as a result of contemporary studies, that there are various studies at different educational levels regarding the effectiveness of the jigsaw technique. It is observed that the majority of the studies focus on the primary school level (Aksoy & Gürbüz, 2012; Amedu & Gudi 2017; Doğan, Üçar, & Şimşek 2015; Peker & Yalçın, 2019; Tarhan, Ayyildiz, Ogunc, & Sesen, 2013; Timayi, Bolaji, & Kajuru, 2015; Türkmen & Büyükaltay, 2015; Uyanık, 2016), with a lower number of studies performed at the university level (Jansoon, Somsook, & Coll, 2008;Turaçoğlu, 2009; Şimşek & Baydar 2019). It is observed, when these studies are examined, that most of them focus on the impact of the technique on success and attitude. The study performed by Jansoon, Somsook and Coll (2008) on university students encompasses the research conducted via the Jigsaw IV method on the learning experiences of students in chemistry laboratories in Thailand. It was concluded as a result of the study that the students enjoyed the interactive nature of the Jigsaw IV approach and that their self-confidence levels increased since they acted as "experts" in front of their peers. A limited number of studies could be found on the impact of the jigsaw technique on communication skills (Çatalkaya, 2019; Halimah & Sukmayadi, 2019).

Teaching through educational games is another method that encourages the active participation of the students in educational environments. Today, educational games are considered as indispensable parts of the education process. The game concept is defined differently by different researchers. According to the definition by the Turkish Language Institution (2017), the "Game" concept is defined as "entertainment with specific rules designed for improving abilities and intelligence while having a good time". Demirel (2001) defines the "Game" concept as one or more individuals taking action to reach a specific goal, either by competing or through cooperation, in accordance with certain rules. Gündüz, Aktepe, Uzunoğlu and Gündüz (2017) emphasize that

games are among the most important elements that enable the social and emotional development in children. Educational games, on the other hand, are accepted as a technique that enables the gained knowledge to be repeated and reinforced in a fun way (Bayat, Kılıçaslan, & Şentürk, 2014). Demirel (2002) has put forth that educational games should be prepared and planned beforehand in order to ensure that they are not only fun but also aim towards a certain goal while also establishing a learning relationship. Educational games increase the mental activities of children through games, thereby making education more effective (Öz Pektaş, 2017). It is possible to concretize abstract concepts through games by establishing a strong relationship between theoretical learning and implementation. In this regard, it is important that games address more than one sensory organ, that they are prepared with concrete materials and that they encourage communication among students during the concretization process of abstract concepts (Kaya & Elgün, 2015).

It is observed, when a literature survey is done, that the use of games has positive impacts on many aspects of education. The educational games used provide a positive attitude development towards learning (Akinsola & Animasahun, 2007), increase academic performance (Kaya & Elgün, 2015), make abstract concepts more concrete (Usta, Işık, Şahan, Genç, Taş, Gülay, Diril, Demir, & Küçük, 2017) and understandable while making a positive contribution to the motivations of students towards the lesson (Rosas et al., 2003). Moreover, educational games can also be used to establish environments in which students can learn while having fun (Cop & Kablan, 2018) and develop their social skills such as communication, discussion and flexibility (Berns, Isla-Montes, & Palomo-Duarte, 2016; Gonzalez & Izquierdo, 2012; Kirriemur & McFarlane, 2004).

There are many studies in the literature that are focused on the effectiveness of the educational games technique at different educational levels. It is observed that the majority of the studies have focused on the primary and secondary education levels (Bakker, Heuvel-Panhuizen, & Robitzsch, 2015; Dönmez, Tekce, & Kirmit, 2020; Kaya & Elgül, 2015; Ören & Avcı, 2004). The number of studies on teacher candidates and teachers is quite limited (Andic, Kadic, Grujicic, & Malidzan, 2018; Kırbaş, 2018). Andic, Kadic, Grujicic and Malidzan (2018) carried out a study for examining the attitudes of students and teachers towards the use of educational games in the teaching process. It was observed, as a result of the study, that word associations, memory games, tangrams and quizzes are among the games that increase student motivation the most, while it was also observed that puzzles and repetitions were considered as the least interesting. On the other hand, teachers have stated that self-performed games are better than ready games since they inspire creativity in teaching.

Only one study was found on educational games that integrated cooperative learning. The study was carried out on secondary school students (Yıldız, Şimşek, & Ağdaş, 2017). However, there are no studies where teacher

candidates developed activities for the jigsaw technique enriched with educational games, applied and expressed their opinions, and also investigated the effect of the applied technique on communication skills. It is suggested in the MOE program, revised in 2018, to implement various active learning methods during classes. These methods can be implemented separately while it is also possible to use more than one method at different stages of the education process. With the idea that using more than one technique together will increase the effectiveness, the jigsaw technique enriched with educational games was applied in the study in order to increase the permanence in learning and to create the learning environment by doing, experiencing and having fun. Teachers have the primary duty of learning the techniques and implementing them. Carrying out activity development and implementation using different methods and techniques prior to their service periods will enable the teacher candidates to have positive opinions on the activity concept and help them in providing efficient learning (Girgin & Şahin, 2019). For this reason, it is very important that the teacher candidates acquire experience on the different techniques, and their opinions on the techniques are also of significant importance.

Purpose of the Research

The aim of the study was to examine the effects on Primary School Teacher Candidates of developing and implementing jigsaw technique activities enriched with educational games in Science and Technology Teaching lessons. The research question for this purpose was determined as "What is the effect of developing and implementing Jigsaw technique activities enriched with educational games in the Science and Technology Teaching lessons on Primary School Teacher Candidates?" For this purpose, the following questions were sought.

Research Questions:

1. What is the effect of developing and implementing activities for the Jigsaw technique enriched with educational games in the Science and Technology Teaching lessons on the communication skills of Primary School Teacher Candidates?
2. What are the opinions of Primary School Teacher Candidates about developing and implementing activities for the Jigsaw technique enriched with educational games in the Science and Technology Teaching lessons?

It is thought that this research will contribute to increase the quality of the primary school teacher undergraduate program and to further the studies in this field.

1 Method

A mixed method pattern making use of both qualitative and quantitative research methods was used in the present study since the aim was to determine the

impacts of "developing and implementing activities for the Jigsaw technique enriched with educational games" on the communication skills of classroom teacher candidates, as well as on their opinions related to the method. A mixed method study is defined as a study during which data are acquired and analyzed via both qualitative and quantitative approaches during a single study or a research program (Creswell, 2013; Johnson & Onwuegbuzie, 2004). An explanatory mixed pattern was used from among the mixed method research types. Quantitative and qualitative data are actualized in two stages sequentially in the explanatory pattern. First, the quantitative data with priority in responding to the study questions are collected and analyzed. During the second stage, qualitative data are collected and analyzed in order to complete the data set (Creswell, 2013).

A single group pre-test post-test weak experimental pattern was used during the quantitative research stage of the study. Weak experimental patterns include studies with a single study group with no random selection (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2008). Lessons in the study group were carried out during the 2018-2019 academic year using the Jigsaw technique enriched with educational games (JTEEG) in Science and Technology II lessons. A case study pattern from among the study types was used during the qualitative research stage of the study. In the case study, the aim of the researcher is to focus on a single fact or event, and to describe and explain the relationship of important factors related to that event (Merriam, 2013).

The design of the study can be seen in Table 1.

Table 1

Design of the study

	Pretest	*Curriculum*	*Posttest*
Research Group	CSS	JTEEG	CSS OFJTEEG

CSS: Communication Skills Scale
JTEEG: Jigsaw Technique Enriched With Educational Games
OFJTEEG: Opinion Form Jigsaw Technique Enriched With Educational Games

1.1 Participants

The purposeful sampling method was preferred in determining the participant group of the study (Miles & Huberman, 1994). The reason why the purposeful sampling method was preferred is that it is aimed to determine the effects of developing Jigsaw technique activities enriched with educational games and applications of Primary School Teacher Candidates taking a Science and Technology Teaching course on their views on communication skills and methods. Patton (2001) emphasized that in the criterion sampling method, the

participants of the study were determined according to a set of predetermined criteria. In the selection of the teacher candidates to participate in this study, it was determined as the basic criterion that the candidates were Classroom Teaching 3rd grade students who took the Science courses, Science and Technology Laboratory Applications and Science and Technology I courses. Therefore, the participant group of this study, in which the criterion sampling based on purposeful sampling is used, consists of 48 teacher candidates (N=12 male and N=36 female) who took the Science and Technology Teaching II lessons at Istanbul University, Faculty of Education, Primary Education Department Classroom Teaching Program in Turkey during the 2018-2019 academic year. The opinions of the teacher candidates were taken on a voluntary basis.

Incomplete scales were excluded from the sample and the data of the 48 pre-service teachers were analyzed. Teacher candidates are between the ages of 20-22. The lessons in the research group were carried out with JTEEG.

1.2 Data collection instrument

1.2.1 Communication skills scale (CSS)

The 5-point Likert type "Communication Skills Scale" developed by Korkut Owen and Bugay (2014) was used during the study for determining the communication skill levels of the teacher candidates. The scale is comprised of 25 items and has four factors. These four factors were named as: "Communication Principles and Basic Skills", "Personal Expression", "Active Listening and Nonverbal Communication" and "Willingness to Communicate". The scale has a Cronbach Alpha reliability coefficient of .88. High scale scores indicate increased communication skills. The lowest scale has minimum and maximum total scores of 25 and 125 respectively. The Cronbach Alpha reliability coefficient for the communication skills scale used in the present study was determined as .928.

1.2.2 Opinion form jigsaw technique enriched with educational games (OFJTEEG)

In the study, the Opinion Form consisting of 13 open-ended questions was used in order to determine the opinions of the teacher candidates about the applications realized with the jigsaw technique enriched with educational games. While preparing the Opinion Form, attention was paid to making the questions easy and understandable, avoid guiding questions, not asking multi-dimensional questions, and organizing the questions within a certain logic (Yıldırım & Şimşek, 2011). The Opinion Form questions were prepared by making use of (Hazar & Altun, 2018; Seyhan & Şimşek, 2019; Sömen & Akcanca, 2018; Önen, Demir, & Şahin, 2012) studies. The prepared questions were arranged after taking the opinions of two academics expert in their fields as well as two science teachers after which they were ready for the pilot study. The pilot study

aims to determine the understandability and appropriateness of the questions and make revisions to develop a more reliable measurement tool (Glesne, 2012). For this purpose, 10 students were included in the pilot study. Based on the responses of the students, it was controlled whether the questions met the clarity requirements and whether they could provide the required data or not, after which necessary revisions were made, thus, finalizing the Opinion Form.

1.3 Implementation process of the jigsaw technique enriched with educational games

The study was carried out within the scope of the Science and Technology Learning II lessons during the spring semester of the 2018-2019 academic year. Teaching the subjects to the teacher candidates in accordance with the JTEEG for 3 lessons per week (3 lessons per week = 40 minutes) and lasted 8 weeks. The time used for implementing the assessment tests was not included in the application process of the lessons. One week before the subjects were taught, a CSS test was given as a pretest. In addition, CSS and OFJTEEG were given as post-tests one week after teaching the subject.

Information on the jigsaw technique, educational games, educational game development, learning subjects, rules of the process, roles of the group members and evaluation strategies was provided before teaching the process to the groups. Eight heterogeneous groups of six people each were formed taking into consideration the weighted grade point averages of the teacher candidates and their genders. Each group was asked to select a name in order to encourage group spirit. The subjects under the "Properties of Matter" unit included in the 4th Grade Curriculum were classified into six sub-headings, after which each member of the group was asked to select a subject. Afterwards, teacher candidates who selected the same sub-heading were gathered in another group, thus, forming six expert groups. The subjects of the expert groups were properties of matter (Expert-1), measurable properties of matter (Expert-2), states of matter (Expert-3), transformation of matter by heat (Expert-4), pure matter and mixture (Expert-5) and mixture separation methods (Expert-6). The groups were then asked to prepare worksheets on their respective subjects in addition to developing an educational game for the assessment of subject related concepts. At this stage, the teacher candidates were asked to prepare their own worksheets in order to improve their research and communication skills since they are all university students. The students made use of books and online material during the specialization period for preparing the worksheets related to their subjects of specialization. At this stage, two academics provided feedback on the prepared worksheets, thus, guiding the students. Afterwards, the prepared worksheets and the developed educational games were presented to the academics for approval. Following the approval of the academics, the worksheets prepared by the expert groups were ready to use. Each expert student returned to their own respective groups at the end of the specialization period

and conducted expert group teachings for a period of six weeks. Attention was given to ensure that there was a high level of interaction between the expert students and the other group members during the expert groups teaching period. Expert students did not only teach the subject but also used various methods such as brainstorming, question-answer and carried out an assessment on the level of learning of the group members by way of an educational game. Table 2 presents an in-depth explanation of the Jigsaw Technique Enriched with the Educational Games technique implementation process.

Table 2

Application process of jigsaw technique enriched with the educational games technique

Week	*Application process*
1	Information on Jigsaw Technique and Sample Activity
	Informing about the Educational Game and Conducting a sample activity
2	Creating Heterogeneous Groups
	Giving names to groups
	Determining the Topics
	Establishing expert groups
3	Teaching the subject of “Properties of Matter” (Expert-1)
	Playing the "Bingo" game in the evaluation phase
4	Teaching the subject of “Measurable Properties of Matter” (Expert-2)
	Playing the game "Name-City" in the evaluation phase
5	Teaching the subject of “States of Matter” (Expert-3)
	Playing the game "Don't Get Angry" in the evaluation phase
6	Teaching the subject of “Transformation of Matter by Heat” (Expert-4)
	Playing the game "Taboo" in the evaluation phase
7	Teaching the subject of “Pure Matter and Mixture” (Expert-5)
	Playing the "Tangram / Puzzle" game in the evaluation phase
8	Teaching the subject of “Mixture Separation Methods” (Expert-6).
	Playing the "Guess It" game in the evaluation phase

1.4 Data analysis

Detailed information on the analysis of the data obtained from the data collection tools used is presented under its own subtitle for each data collection tool.

1.4.1 Analysis of data obtained from the communication skills scale (CSS)

In the quantitative data analysis, firstly Shapiro-Wilk results of pre-test and post-test data from the Communication Skills Scale (CSS) were examined to determine the normality of the distribution. As a result of the mentioned statistical analyses, it was found that the data were normally distributed.

Therefore, parametric statistical analysis techniques were used because the data showed a normal distribution and the number of individuals in the sample was less than 50 (Büyüköztürk, 2019). The dependent group t-test was used to determine whether there was a statistically significant difference between pre and post tests related to the communication skills scale (CSS). A significance level of .05 was set in the interpretation of the data (Creswell, 2012). In order to interpret statistical significance, the effect size was employed in the research. Effect size (η2) indicates how much the independent variable or factor explains the total variance in the dependent variable. Effect size (η2): It ranges from 0.00 to 1.00, and (η2) values of .01, .06 and .14 are defined as small, medium, and large effect sizes in the same order. The Eta-squared statistic was used to calculate the effect size of the Dependent Samples t-Test (n = number of samples) and the calculation was made with the formula η2=t2/t2+(n-1) (Büyüköztürk, 2019).

1.4.2 Analysis of the data obtained from the opinion form jigsaw technique enriched with educational games (OFJTEEG)

In the qualitative data analysis, an Opinion Form containing 13 open-ended questions was analyzed using content analysis and descriptive analysis methods during the study (Yıldırım & Şimşek, 2011). The responses to the Opinion Form questions were written down in a computer environment during the first stage of the analysis, thus, preparing the data for analysis. Afterwards, all raw data were read, examined and classified, followed by the coding procedure (Rossman & Rallis, 2003). The codes related with the same headings or subjects were grouped to form categories. Finally, similar categories were grouped under common themes. The names of the students were hidden during the analysis and codes such as S1, S2, … , S41 were used instead.

1.5 Validity and reliability analysis

Both quantitative and qualitative measurement tools were used in the study in accordance with the nature of the mixed method. For a study to be acceptable, it must have valid and reliable measurement tools. The reliability of the communication skills scale, which was used as a quantitative measurement tool in the study, was provided by Cronbach alpha analysis. Expert opinions were obtained from 2 faculty members and 2 science teachers in order to ensure the validity of the communication skills scale. In order to ensure the reliability of Opinion Form Jigsaw Technique Enriched with Educational Games, coding was done by 2 faculty members and 1 Science teacher who are experts in their field. In order to calculate the coding reliability, the Miles and Huberman's (1994) formula "reliability = (number of consensus) / (total agreement + number of disagreement)" was used. Coding reliability was calculated as 0.92. Since this value is above 0.70, coding is considered reliable (Miles & Huberman, 1994). In order to ensure the content validity of the form, 2 faculty members who are

experts in their fields and 1 Science teacher examined the form, and the necessary corrections were made.

2 Findings

2.1 Findings from the communication skills scale (CSS)

The Communication Skills Scale (CSS) was applied to Primary School Teacher Candidates before and after teaching the subject in order to find an answer to the first research question of: "What is the effect of developing and applying activities for JTEEG on the communication skills of Primary School Teacher Candidates?"

Since the sample size in the study was smaller than 50, it was determined by the Shapiro-Wilks test whether the obtained data showed a normal distribution. As seen in Table 3, it was determined that each data set showed a normal distribution ($p > 0.05$). For this reason, it was decided to use parametric statistical methods in the analysis of the data obtained from the Communication Skills test.

Table 3

Communication skills scale (CSS) Shapiro-Wilks test findings

Scale		*Statistics*	*df*	*p*
CSS	Pretest	0.968	48	0.208
	Posttest	0.953	48	0.054

The Dependent group t-test was used to determine whether there was a significant difference between the Communication Skills Scale (CSS) mean scores of the Primary School Teacher Candidates before and after the JTEEG application. The findings presented in Table 4 show that there is a significant difference between Teacher Candidates' (CSS) average scores before and after the application [$t(47) = 2.09$, $p < 0.05$, $\eta 2 = 0.085$]. This difference is in favor of the posttest averages. Considering the effect sizes, the applied activities increase the communication skill levels of teacher candidates, it has been concluded that it has a broad impact level above the medium level. Therefore, it can be said that JTEEG applications positively contribute to the Communication skills of teacher candidates.

Table 4

Communication skills scale (CSS) pre-test – post-test dependent group t-test findings

Scale		*N*	*X*	*SS*	*Sd*	*t*	*P*	*η2*
CSS	Pretest	48	4.17	. 37				
	Posttest	48	4.35	.47	47	2.09	.042	.085

2.2 Findings on the opinion form jigsaw technique enriched with educational games (OFJTEEG)

The Opinion Form Jigsaw Technique Enriched with Educational Games (OFJTEEG) was applied to the Primary School Teacher Candidates after teaching the subject in order to find an answer to the second research question of: "What are the opinions of Primary School Teacher Candidates on developing and implementing activities for the JTEEG?" Content analysis and descriptive analysis were performed on the responses of the teacher candidates to the questions in the Opinion Form in order to determine their opinions related to the technique.

Based on the content analysis findings of the study; four main themes were obtained: "Positive Opinions", "Negative Opinions", "Preferring the Technique" and "Technique-related changes suggestions". A table was prepared for each theme. The tables included findings on the frequency values of the codes. The findings were supported by direct citations.

2.2.1 Theme 1: "Positive Opinions"

The "Positive Opinions" theme was formed by taking into consideration the responses to the five Open-Ended question in the Opinion Form. Table 5 presents the distribution of the responses to the questions below directed at the students within the scope of Theme 1:

Question 1: What are your positive opinions on developing and implementing activities for the JTEEG when evaluated from the perspective of the teacher?

Question 2: What are your positive opinions on developing and implementing activities for the JTEEG when evaluated from the perspective of the student?

Question 3: What are your positive opinions on developing and implementing activities for the JTEEG when evaluated with regard to learning?

Question 4: What are your positive opinions on developing and implementing activities for the JTEEG when evaluated with regard to the teaching environment?

Question 5: What are your positive opinions on developing activities for the JTEEG when evaluated with regard to activity development process?

Table 5

Findings of primary school teacher candidates on the theme of "Positive Opinions"

	Positive opinions about technique from the teacher perspective	*f*
1	Enjoying the lesson with the educational game supported jigsaw technique	23
2	More communication with the students	14
3	Being able to teach with a smaller group of students	12
4	Providing experience for the teaching profession	10

5	Students can increase their motivation to the lesson	7
6	Ability to learn a lot of new information by discussing in expert groups	5
Positive opinions about the technique from the student's perspective		*f*
1	Enjoying the lesson with the educational game supported jigsaw technique	30
2	Being always active in lessons	24
4	Increased interest in the lesson	10
5	Providing the opportunity to communicate with other students	7
6	Increasing self-confidence	5
Positive opinions about the technique with regard to learning		*f*
1	Providing permanence in learning	21
2	Providing better quality learning with creative activities	18
3	Providing the opportunity to learn while having fun with the educational game supported application	16
4	Providing the opportunity to learn by doing and living	12
5	Learning can take place quickly	9
6	Ensuring the consolidation of the subject with the application supported by educational games	4
Positive opinions about the technique with regard to the teaching environment		*f*
1	Allowing all students to communicate with each other	20
2	Allowing group work	12
3	Provides many opportunities to learn new games	9
4	Providing a *refined* competition environment	7
Positive opinions about the technique with regard to activity development process		*f*
1	Enjoyable event development process	12
2	Developing social skills	10
3	Ensuring academic development of the activity development process	8
4	Providing collaboration opportunity	7
5	Providing an opportunity to increase creativity in the event development process	6
6	Allowing the development of different ideas in the event development process	5

In Table 5, it is seen that the teacher candidates have various positive opinions about developing and implementing activities related to JTEEG.

It was observed when the "Positive opinions about technique from the teacher perspective" were examined that the majority of the teacher candidates stated that JTEEG can be effective in ensuring that the lesson is enjoyable (f=23). In addition, the participants also put forth positive opinions on JTEEG, such that it encourages more communication with the students (f=14), classes have groups of fewer students (f=12), provides experience on the teaching profession (f=10), increases the motivation of the students towards the lesson (f=7) and enables the acquisition of new information through expert group discussions (f=5). From the findings obtained, it can be said that teacher candidates enjoy teaching lessons in

collaborative groups with educational games, they think of them as motivational environments and they think that they will experience the teaching profession by applying the jigsaw technique. The expressions of some of the teacher candidates on this issue are presented below:

T24: Educational games eliminated boredom. Using games for assessment rather than traditional methods made the class more interesting and joyful.

T10: It is positive that teachers interact more with each group member since the number of individuals in the groups is small. The students can express themselves more comfortably, thus, increasing participation.

T7: When we took on the role of the teacher for teaching this lesson, we had the opportunity to experience how we can teach this knowledge in a way that is in accordance with the level of the students.

It was observed when the "Positive opinions about the technique from the student's perspective" were examined that the majority of the teacher candidates indicated that lessons are much more joyful with JTEEG. Moreover, the participants also stated various positive opinions with regard to the actualized implementations such as being continuously active in the classroom (f=24), increased interest towards the lesson (f=10), establishing communication with the other students (f=7) and increasing self-confidence (f=5). When evaluated from the obtained findings in terms of students, it can be said that teacher candidates are of the opinion that they enjoy teaching lessons in cooperative groups with educational games, increase their communication skills in the process, and increase their self-confidence as they actively participate in the process by applying the jigsaw technique.

The expressions of some teacher candidates have been presented below:

T3: The lesson was fun as a student because active learning and playing different educational games made it very entertaining.

T46: .I am of the opinion that it helps to improve communication since we get to work with peer groups a lot.

T44: It is a very effective method for students to learn both concepts and social relations. Learning through interacting with each other also improves the self-confidence of students.

T12: This method also strengthens the communication of the students with their other friends. I had the chance to communicate with people in the classroom with whom I had not spoken before.

It was observed when "Positive opinions about the technique with regard to learning" were examined that the majority of the teacher candidates stated that JTEEG ensures permanence in learning (f=21). In addition, the participants also stated the following positive opinions on the implementations; ensuring a higher quality learning through creative activities (f=18), providing the opportunity to learn while having fun (f=16), providing the opportunity to learn by doing and experiencing (f=12), ensuring faster learning (f=9) and reinforcing the subject further (f=4). From the findings obtained, it can be said that teacher candidates

for learning are of the opinion that permanent learning is ensured while teaching in cooperative groups with educational games and learning in a fun and faster way.

The statements of some teacher candidates on this issue are presented below:

T10: It is a very nice method since it encourages creativity and requires active participation from each group member. Teaching the lesson through educational games makes it even more fun and ensures greater permanence in learning.

T17: Learning is more effective and fast since the activities and materials used during the lessons are easily accessible.

T4: Supporting the subject with educational games in an entertaining manner helped us to learn the rules of the game and further reinforce the subject.

T21: I believe it was a very permanent form of learning since all students learned by experience throughout the lesson.

T29: I believe that the students learned better since they were more active, and many games and activities were used throughout the lesson.

It was observed, when "Positive opinions about the technique with regard to the teaching environment" were examined that the majority of the teacher candidates stated that JTEEG enables all students to communicate with each other (f=20). Moreover, the participants also put forth the following positive opinions on the implementations; encouraging group work (f=12), providing the opportunity to learn many new games (f=9) and establishing a refined environment for competition (f=7). From the findings obtained, it can be said that teacher candidates think that educational games and lessons taught in collaborative groups take place in environments that allow group work and communication, as well as provide opportunities for learning new games.

The statements of some teacher candidates on this issue are presented below:

T9….I wish to use the "Bingo" game that I used while teaching with my own students in the future. I had the chance to learn many new games that I can use in the future since the method is supported by games. The refined competition in the environment enabled us to follow the lesson enthusiastically with both our group and with other groups.

T16: The knowledge I acquired was permanent since I learned it through fun games, and I also have many ideas for games that I can use in the future.

T38: The teaching environment is much better than a regular classroom environment because there is one-to-one interaction with the students. Students can participate actively in all activities since the number of individuals in each group is small.

It was observed when the "Positive opinions about the technique with regard to activity development process" were examined that the majority of the teacher candidates stated that the activity development process for JTEEG is enjoyable (f=11). In addition, the participants also stated various positive opinions on the activity development process such as that it enables the development of social skills (f=10), enables academic development (f=8), provides opportunity for

cooperation (f=7), enables the improvement of creativity (f=6) and the development of new ideas (f=6). From the findings obtained, it can be said that teacher candidates think that their social skills, creativity by developing new games, and their academic success by working together increase in lessons taught in collaborative groups by developing educational games.
The opinions of some teacher candidates on this issue are presented below:
T2: Our creativity increased significantly when developing the activities.
T9: Prior to the lesson, we designed the experiments and activities together with our friends to be presented to the group. Hearing new ideas from my friends during this period, and debating with them, improved our learning significantly.
T42: I enjoyed it a lot since I worked with my friends during the activity development process.
T20: Skills of socialization and cooperation increase since this is group work.

2.2.2 Theme 2: "Negative Opinions"

The "Negative Opinions" theme was formed by taking into consideration the responses to the five open ended questions in the opinion form. Table 5 presents the distribution of the responses to the questions below directed at the students within the scope of Theme 2:
Question 1: What are your negative opinions on developing and implementing activities for the JTEEG when evaluated from the perspective of the teacher?
Question 2: What are your negative opinions on developing and implementing activities for the JTEEG when evaluated from the perspective of the student?
Question 3: What are your negative opinions on developing and implementing activities for the JTEEG when evaluated with regard to learning?
Question 4: What are your negative opinions on developing and implementing activities for the JTEEG when evaluated with regard to the teaching environment?
Question 5: What are your negative opinions on developing activities for the JTEEG when evaluated with regard to activity development process?

Table 6

Findings of primary school teacher candidates on the theme of "Negative Opinions"

Negative opinions about technique from the teacher perspective		*f*
1	Difficulty in classroom control in the implementation of activities	9
2	Application requires preparation	6
Negative opinions about the technique from the student's perspective		*f*
1	Difficulty working together for students with different levels of sense of responsibility	1
Negative opinions about the technique with regard to learning		*f*
1	It is boring to be constantly active	1
Negative opinions about the technique with regard to the teaching		*f*

environment		
1	Difficulty practicing in crowded groups	6
2	Difficulty applying in the classroom	5
3	Time management difficulties related to the event	4
Negative opinions about the technique with regard to activity development process		*f*
1	Difficulty in developing the activity in accordance with the student level	8
2	Difficulty working with students of different opinions while developing activities	7

In Table 6, teacher candidates stated that they have some negative opinions with regard to JTEEG in addition to the positive opinions. While some teacher candidates indicated that they do not have any negative opinions on jigsaw applications enriched with educational games.

It was observed when the "Negative opinions about technique from the teacher perspective" were examined that it may lead to difficulties in classroom control (f=9) and that it may require preparation (f=6).When the findings are evaluated from the point of view of the teacher, it can be said that the teacher candidates have difficulty controlling the class the most in the lessons taught in cooperative groups with educational games. The expressions of some teacher candidates on this issue are given below:

T24: It may be difficult to control the class with young age groups.

T2: It requires extra time before the lessons since we would need to make preparations.

It was observed when the "Negative opinions about the technique from the student's perspective" were examined that one participant indicated that students with different levels of sense of responsibility may have difficulties in working together (f=1). When the obtained findings are evaluated from the point of view of the student, it can be said that a large proportion of teacher candidates do not have a negative opinion about the lessons taught in cooperative groups with educational games, while the negative opinion teachers have difficulty in working with individuals with different knowledge levels and character traits. The expression of the teacher candidate on this issue is provided below:

T20: Even though working with the group has positive aspects, there may be some people who do not have a group culture. There are also people who do not produce any ideas on what should be done or those who do not take on any duties. That is why the other group members have difficulties.

It was observed when the "Negative opinions about the technique with regard to learning" were examined that the participants stated that it is boring to continuously perform new activities (f=1). From the findings obtained, it can be said that the teacher candidates think that it can be boring to do new activities continuously while learning takes place in the lessons taught in collaborative groups with educational games. The expressions of some teacher candidates on this issue are presented below:

T47: It was nice to learn the subject through activities, however, after a while, performing activities all the time ended up becoming boring.

It was observed when the "Negative opinions about the technique with regard to the teaching environment" were examined that the participants stated that it is difficult to implement the developed activities in crowded groups (f=6) and in a classroom environment (f=5), and that activity related time management is difficult (f=4). From the findings obtained, it can be said that teacher candidates had difficulties due to crowded classes and time limitations in lessons taught in collaborative groups with educational games.

The expressions of some teachers on this issue are presented below:

T15: It is difficult in very crowded groups. Learning is certainly hampered if there is chaos in the environment. Attention is required during the experiments and activities.

T43: ……takes too long. The teacher may not end up teaching the subject in full in the allotted time frame. The students may get bored.

T9: The fact that the environment is a regular classroom environment may have resulted in noise.

It was observed when the "Negative opinions about the technique with regard to activity development process" were examined that the participants stated that it may be difficult to develop the activity in accordance with the student level (f=8), and that it may be difficult for students with different opinions to work together (f=7). From the findings obtained, it can be said that teacher candidates have difficulty in developing educational games and working with pre-service teachers who have different mentalities and knowledge levels in lessons taught in cooperative groups.

The statements of some teacher on this issue are provided below:

T37: We had a difficult time when trying to prepare an activity that suited the class level.

T28: We had a clash of ideas while developing the activity. We tried to select ideas from among them.

2.2.3 Theme 3: "Preferring the Technique"

The theme of "Preferring the Technique" was formed based on the responses to the 2 open ended questions included in the opinion form. Table 7 presents the distribution of the responses to the following questions directed to the students for Theme 3:

Question 1: Would you prefer using JTEEG in your lessons when you become a teacher?

Question 2: In which lessons would you prefer to use JTEEG?

Table 7

Findings of primary school teacher candidates on the theme of "Negative Opinions"

Preference to implement the technique	*f*
1 Certainly prefer	39
2 Prefer to implement from time to time	3
3 Prefer to implement for acquisitions that require activities	2
4 Would not prefer	4
Lesson preference where the technique will be implemented	*f*
1 Preferring to use in all lessons	16
2 Preferring to use in science and mathematics lessons	13
3 Preferring to use in science lessons	9
4 Preferring to use in science, social and mathematics lessons	6

It was observed when the "Preference to implement the technique" was examined that the participants stated opinions such as "certainly prefer" (f=39), "prefer to implement from time to time" (f=3), "prefer to implement for acquisitions that require activities" (f=2) and "would not prefer" f=4). From the findings obtained, it can be said that the majority of the teacher candidates preferred teaching the lessons in collaborative groups with educational games. The expressions of some teachers on this issue are presented below:

T16: I would want to use this technique when I become a teacher, to ensure that the students are more active, that they take on responsibility and because it makes the lessons more fun and permanent.

T26: I can say that this would be one of the techniques that I will implement when I become a teacher because I am of the opinion that it makes the lessons more fun while ensuring that the acquired knowledge is permanent.

T5: I do not prefer to use it in the future because it requires a lot of time.

It was observed when the "Lesson preference where the technique will be implemented" was examined that the participants stated opinions such as "Preferring to use in all lessons" (f=16), "Preferring to use in science and mathematics" (f=13), "Preferring to use in science lesson" (f=9), and "Preferring to use in science, social and mathematics lessons" (f=6). From the findings obtained, it can be said that the majority of the teacher candidates think of applying it in all lessons teaching lessons in collaborative groups with educational games, and some of them prefer to apply especially in abstract lessons such as science and mathematics. The expressions of some teachers on this issue are presented below:

T2: It may be useful to use it in lessons containing abstract subjects such as science and mathematics.

T33: I can use this technique in every lesson because it is a technique that can be applied in every lesson.

2.2.4 Theme 4: "Technique-related Changes Suggestions"

The theme of "Technique-related Changes Suggestions" was formed based on the responses to the 1 open ended question included in the opinion form. Table 8 presents the distribution of the responses to the following question directed to the students for Theme 4:

Question 1: If you wanted to replace JTEEG, what would your suggestions be?

Table 8

Findings of primary school teacher candidates on the theme of "Technique-related changes suggestions"

Technique-related changes suggestions		*f*
1	Not wanting to change	37
2	Increasing the number of games	5
4	Add different events	4
5	Application in laboratory environment	2

It was observed when the "Technique-related changes suggestions" was examined that the participants stated that they do not want to make changes (f=37), they want to increase the number of games (f=5), they want to add different activities (f=4), and they suggest working in the laboratory environment (f=2). From the findings obtained, it can be said that the majority of the teacher candidates did not prefer to change anything related to the teaching of lessons in cooperative groups with educational games. This finding can be thought of as indicative that most of the pre-service teachers liked the technique.

The expressions of some teachers on this issue are presented below;

T21: I wouldn't want to change anything.

T46: I think it might be possible to increase the number of games.

3 Discussion and conclusions

The aim of the present study was to examine the impacts of developing and implementing activities for JTEEG on Primary School Teacher Candidates. For this purpose, the Science and Technology Teaching II lessons included in the Primary Education Department Classroom Teaching Program at the Istanbul University Faculty of Education during the 2018-2019 academic year was carried out by developing and implementing activities for JTEEG.

It was determined when the data acquired from the Communication Skills Scale (CSS) applied for evaluating the impacts of developing and implementing activities for JTEEG on the communication skill levels of classroom teacher candidates were examined that there was a statistically significant difference between the communication skill levels of the teacher candidates before and after the implementation. The acquired findings point out that the communication skills of teacher candidates have developed significantly with

the implemented technique. Throughout the implementation period, the teacher candidates prepared worksheets together with the group members on the subjects of expertise making use of books and online material, developed an educational game for the assessment of the concepts related with the subject at hand and communicated actively with the group members. It can be thought that as a result of the active participation of the teacher candidates in the lesson, their teacher-student interaction, and their fulfillment of their assigned tasks by taking responsibility, and their communication skills have been developed. It was determined, as a result of the study, that the use of the jigsaw technique, which is one of the cooperative learning methods, together with educational games provide opportunities to the classroom teacher candidates for improving their communication skills, and that the communication skills of teacher candidates improved as a result. Even though no studies could be found in the literature examining the impact of developing and implementing activities for JTEEG on the communication skills at the teacher candidate level, Halimah and Sukmayadi (2019) put forth that implementing the jigsaw technique is successful for improving the verbal communication skills of teacher candidates. Prastyo (2017) found in Indonesia that the cooperative learning method significantly increased the communication competencies of teacher candidates in her study, in which she investigated the effect on the communication competencies of pre-service teachers. There are studies investigating the effect of cooperative learning on communication skills at different learning levels. Towns and Grant (1997) found that cooperative learning improves the interaction between students and interpersonal communication skills as a result of the study in which she applied the cooperative learning method in the teaching of Thermodynamics course at the graduate level. In a different study, Çatalkaya (2019) conducted a study on the impacts of the Jigsaw I technique implemented for teaching "the Household Wastes, Recycling and Chemical Industry" subjects of the Science lesson for seventh grade secondary school students. It has been emphasized as a result of the study that the jigsaw technique has improved the communication skills. Studies conducted in the literature show that the cooperative learning method supports communication and interaction (Sarıgoz, 2017). Moreover, it is emphasized, in accordance with the results of studies conducted using the jigsaw technique, that the jigsaw technique contributes to improving various skills of students such as teamwork skills, critical thinking skills, laboratory material recognition and usage skills, as well as communication skills (Artut & Tarim, 2007; Perkins & Saris, 2001; Kumar, Kalasuramath, Patil et al., 2017; Souvignier & Kronenberger, 2007).

Based on the analysis of the data acquired from OFJTEEG applied for the assessment of the opinions of classroom teacher candidates on developing and implementing activities for JTEEG, the opinions of the classroom teacher candidates were classified under four main headings as; "Positive Opinions",

"Negative Opinions", "Preferring the Technique" and "Technique-related changes suggestions".

The "Positive Opinions" theme includes the positive contributions according to the classroom teacher candidates of lessons taught with JTEEG, such as making the lessons more joyful, providing experience for the teaching profession, enabling academic development, ensuring learning permanence, enabling more interest in the lesson, improving communication skills, facilitating learning through having fun, encouraging the students to be more active in class, improving creativity, increasing self-confidence and enabling high quality learning through activities. It can be concluded based on the study results that the teacher candidates enjoyed developing educational games for the topic at hand as well as developing and implementing activities for the jigsaw technique. It can be thought that the pre-service teachers showed academic success on the subject area and gained experience in the teaching profession by helping each other to learn by using the jigsaw technique. Nhu (1999) investigated the behaviors of students working in a cooperative learning environment, students' thoughts about cooperative learning and their attitudes towards this learning-teaching method in a study conducted with 27 students studying in the chemistry department of a university. As a result of the study, it was determined that the cooperative learning approach helps students learn, and they understand the subject better when working together in small groups. A different study stated that the cooperative learning method helped pre-service teachers to see themselves as teachers (Turaçoğlu, Alpat, & Ellez 2013). In parallel with the results obtained from their study, Ilgaz, Çalıklar, Yıldız and Şimşek's (2018) studies of teacher candidates' views on Jigsaw and Let's Ask Together Let's Learn Together techniques reveal that teacher candidates' collaborative learning techniques increase their self-confidence, improve their communication skills, and affect their perspective on group work positively. It was determined that they used expressions as changed. This can be considered to be due to JTEEG that encouraged the students' active participation in the class, in addition to enabling the students to be included in all stages of learning while providing them the opportunity for learning the subject through games. Teaching with games is described as a recently renewed field that can be used for learning purposes (Charsky & Ressler, 2011). In addition, it has been determined that the games offer environments that support cooperation, increase the level of motivation and self-confidence of the students, and make them interested in the subject (Bayırtepe & Tüzün, 2007). The results of the study are in accordance with the results of previous studies conducted using educational games and the Jigsaw technique (Bayat, Kılıçarslan, & Şentürk, 2014; Savaş & Gülüm, 2014; Önen, Demir, & Şahin, 2012; Doğan, Uçar, & Şimşek, 2015; Yıldız, Şimşek, & Ağdaş, 2017; Jansoon, Somsook, & Coll, 2008; Amedu & Gudi, 2017). Önen, Demir and Şahin (2012) carried out a study during which the opinions of science teacher candidates on games were acquired, and the developed games were

evaluated, as a result of which, it was determined that teacher candidates have positive opinions on the use of games in teaching science; and it was also determined that the developed games were of high quality and educating. Jansoon, Somsook and Coll (2008) examined the impact of the jigsaw technique on attitude in teaching chemistry. The study was conducted with 244 first year undergraduate students at Thai University. The students indicated that they do not like the chemistry lessons prior to the implementation, whereas they indicated that they learned more and that their self-confidence levels increased after the implementation. Even though a limited number of studies have been determined in the cooperative learning methods integrated with educational games, Yıldız, Şimşek and Ağdaş (2017) have also obtained similar results to those of the present study. It was determined, as a result of the implementation, that the students subject to cooperative learning model enhanced with educational games have a higher motivation towards learning science, and that their social skill levels were higher at a statistically significant level.

Even though the majority of the classroom teacher candidates expressed positive opinions on the lessons taught via JTEEG under the "Negative Opinions" theme, a small number of teacher candidates put forth that the technique has adverse impacts, such as difficulties in classroom control, time management when implementing the activities, developing the activities in accordance with the student level and working together with students with different characteristics. It can be considered, based on the study results, that the teacher candidates may have experienced difficulties in classroom management and time management due to excessive noise and discussions between the students during group work, in addition to various other problems and difficulties partially resulting from students with different characteristics, placing the burden and responsibility on other members. Similar to the results obtained from the study, Edgerton and McKechnie (2002) found in their study that a large number of group members and having to spend too much time for group work outside of class negatively affected group work. In Salomon and Globerson's study (1989), the students who contributed to the group saw that some students got a good grade because the group was successful even though they did not contribute anything to the group, and they did not want to continue their group work. Seyhan and Şimşek (2019) conducted a study in which the implementation was made using the jigsaw technique which put forth that some of the students disturbed the other students instead of working with their own groups and that they got bored because the group work took very long. It is very important to create positive interdependence and harmony within the group. When intra-group disputes are not resolved, students can even move away from the task (Gibbs, 1995). For this reason, cooperative learning environments (individual responsibility, positive interdependence, face-to-face interaction, social skills and group process) should be arranged in accordance with the criteria (Johnson & Johnson, 1989). In this study, teacher candidates had difficulties in developing activities. It can

especially be stated that the reason why teacher candidates experience difficulties in developing activities in line with the student level is their lack of experience on this subject. Tuzcuoğlu, Güven and Efe (2006) conducted a study during which they reported that the game should be suited to the age of the child, the interests and needs of the child, as well as the development characteristics of the age group. This shows that the teacher candidates should take into consideration the age-class levels of the students when designing activities. Kapucu and Çağlak (2018) carried out a different study as a result of which they reported that the teacher candidates experienced difficulties in coming up with games during the implementation. This shows that the teacher candidates should take into consideration the age-class levels of the students when designing activities. Hence, we are of the opinion that teacher candidates should be given the opportunity to take part in many implementations in order to become competent in preparing games and activities in accordance with the classroom level.

The majority of the classroom teacher candidates stated with regard to the lessons taught via JTEEG under the "Preferring the Technique" theme that they would prefer using the technique in their lessons, since it makes the lessons more fun while also ensuring higher permanence in learning. There are also similar results in the literature. Şimsek, Örten, Topkaya and Yıllar (2014) reported in their studies that the teacher candidates stated that cooperative learning techniques increase academic success while also making significant contributions to them from a social and psychological perspective. Kırbaş and Girgin (2018) put forth in another study examining the importance of the educational games technique in teaching from the perspective of teachers, that the reasons why teachers prefer the technique are increasing classroom attendance, acquisition of behaviors and the reinforcement of the acquired behaviors, in addition to developing skills such as socialization, tolerance, assertion, communication and responsibility. Whereas a small number of teacher candidates stated that they would not prefer using the technique in their future lessons because its implementation time is very long. This is considered to be due to the inexperience of the teacher candidates both in the subject and the technique, due to their lack of previous experience in using the technique. The majority of the teacher candidates who preferred to use the technique indicated that they would like to use it in all lessons, while some stated that they would especially want to implement the technique in lessons such as Science and Mathematics that include abstract concepts. Science lessons are among the lessons that students struggle with since they include a great number of abstract concepts. Hence, implementations that will make these concepts more tangible are important for facilitating the teaching of these lessons. Similarly, Göktaş, Küçük and Topçu (2014) reported in their studies that educational games visualize the concepts, thus, making them more concrete.

While the majority of the classroom teacher candidates stated that they are satisfied with the lessons carried out using JTEEG under the "Suggestions for technique related changes" theme, and that they do not want to make any changes, some have indicated that they want the number of games to be increased because they make the lessons fun. Un Açıkgöz (2008) states that the games developed by teachers and students using their own creativity or adapted from daily life to the classroom will help the students to learn, and that including games in learning-teaching processes will make the lessons interesting, and students will be motivated. It can be said that with the educational games performed and applied in the study, teacher candidates' motivation for the lesson increased, and they liked the learning environment that offers the opportunity to learn by living by doing in cooperative groups.

In conclusion, it was observed, as a result of the present study on the impacts of developing JTEEG related activities and implementing them that the technique used in this study resulted in an increase in the communication skill levels of teacher candidates. Communication is among the concepts that we should focus on during the present century. It is important that teacher candidates who will be educating students in the future develop their skill levels in order to improve the communication skills of their students. As can be understood from the results of the present study, JTEEG is effective in developing the communication skills of classroom teacher candidates. Hence, it can be suggested in the light of the findings of this study that education environments should be arranged based on JTEEG.

There were several limitations to this study. This research relied on only Primary School Teacher Candidates' data and the study data were only collected in Turkey, and so, the study results are only regionally generalizable. It is suggested to implement the study on teacher candidates continuing their educations in different disciplines and regions. It can be stated, based on the statements of the teacher candidates, that they mostly have positive opinions on the implemented technique. Science lessons are among the lessons that students mostly approach with concern. The fact that they involve abstract concepts and that some of its subjects are perceived as difficult are among the reasons for this concern. Students get to take the science lessons for the first time in 3rd grade. It is very important that the classroom teachers who will teach the science lessons for the first time increase the interest in the class making sure that the students enjoy science. It is up to classroom teachers to make the science lessons popular, and to attract students' attention. In addition to knowing the subject area, the teacher should also be creative to attract students' attention to the lessons. A teacher should not only be creative in thinking, but should also be creative in matters of emotions, motivation, socialization, communication skills, collaboration, etc. (Novotná, Verbovanec, & Török, 2013). One of the environments where both teachers and students can reveal their creativity and learn with fun is the Jigsaw Technique Activities Enriched with Educational

Games applied in the study.It can be put forth, based on the findings of the study, that JTEEG is quite effective in making children like the science lessons and learn through enjoyment, since it enables them to be more active, creative, and take responsibility, while providing them with the opportunity to develop new games and activities, establish more communication with the other students, in addition to making abstract concepts more concrete. Hence, it is very important that the techniques that will be used for this purpose are first learned and implemented by teacher candidates. We are of the opinion that the hours should be increased for applied lessons on the technique. The implementation developed through the integration of educational games and the jigsaw technique from among cooperative learning methods has been limited to the "Properties of Matter" unit in the science lesson. It can be considered that implementing this technique on other subjects of the Science lessons will enable the students to find science more attractive and interesting, thereby making a significant contribution to science through facilitating rapid learning.

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The Effectiveness of Mindfulness-Based Thriving Programs on High School Students' Perceived Stress, Mindfulness, Thriving and Self-Efficacy Levels

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Abstract:
Introduction: Adolescence is a period of rapid change marked by increased stress levels. Individuals with high self-efficacy better alleviate the effects of the stress of this period by exerting conscious control over their own thoughts, behaviours and feelings – a trait strongly associated with mindfulness. In this regard, the concept of mindfulness-based self-efficacy has been a much-researched area in recent students. Mindfulness practices ensure individuals with vitality and energy since they learn to become more open and engaged. In this respect, mindfulness is associated with thriving. This experimental research investigates the effects of the Mindfulness-Based Thriving Program (MTP) on high school students' perceived stress, mindfulness, thriving and self-efficacy levels.
Methods: The study was conducted with 17 randomly assigned, female 11th grade students ($\bar{X}$=16.62 for experimental group, $\bar{X}$=16.77 for control group), who acquired educational support in Uskudar Municipality Youth Academy in the 2019-2020 academic year. The inclusion criteria included scoring highly on the Perceived Stress Scale (PSS) and scoring lowly on the Mindfulness Attention Awareness Scale (MAAS), Thriving Scale (TS) and Self-Efficacy Scale (GSES) in a pre-test assessment. The experimental group (n=8) received a six-session MTP intervention developed by the researcher, while the control group (n=9) received no intervention. To determine the immediate and long-term effects of the MTP, all participants completed post-tests (PSS, MAAS, TS, GSES) two months after the program.
Results: The 6-week MTP applied to adolescents was significantly effective in decreasing perceived stress and increasing mindfulness, thriving and self-efficacy levels.
Discussion: All findings were supported by the relevant literature and recommendations on their possible application have been given.

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Limitations: Scores obtained from the scales, the narrow range of the sample (only 11th grade female students), the lack of a placebo group to support reliability and the lack of a comparable program for the current one all indicated the limitations of the study.
Conclusions: The 6-week MTP applied to adolescents showed the effectiveness in decreasing perceived stress and increasing mindfulness, thriving and self-efficacy levels. In this regard, thriving and mindfulness together have an important role in the development of self-efficacy and in decreasing perceived stress during adolescence. Thus, all these conclusions highlight the potential contribution of eclectic mindfulness practices for adolescence.

Key words: mindfulness, mindfulness-based thriving program, perceived stress, self-efficacy, thriving.

Introduction

Youth in today's world, especially middle adolescents, are faced with increasing challenges in several domains of development – not least in the academic, social, and cognitive realms. These features need to be successfully managed in order to ensure their adaptive functioning (Arnett, 2007; Byrne, Davenport, & Mazanov, 2007; Neff & McGehee, 2010). Therefore, adolescence is characterized by increased stress levels (Neff & McGehee, 2010). In Turkey, high school students in particular experience higher levels of stress due to the intense pressure instilled in them by university entrance exams (Dogan & Kuzgun, 2008; Hevedanlı & Ekici, 2011; Melman, Little, & Akin-Little, 2007). These stressors force adolescents to seek to distance themselves from their future goals and school environment (Hevedanlı & Ekici, 2011; Şahin, Gunay, & Bati, 2006). Accordingly, the protective factors needed to cope with these stressors gain importance during adolescence.

One of the preventive factors in the face of stressors is self-efficacy. Self-efficacy is concerned with people's beliefs in their own capabilities to manage stressful situations (Cicognani, 2011; Greason & Cashwell, 2009). Individuals with high self-efficacy better alleviate the effects of stress by exerting conscious control over their own thoughts, behaviours and feelings, in a stance strongly associated with mindfulness. Most studies provide supportive evidence for the relationship between mindfulness and self-efficacy (Blecharz, Luszczynska, Scholz et al., 2014; Caldwell, Harrison, Adams, Quin, & Greeson, 2010; Muris, Meesters, Pierik, & de Kock, 2016). In this regard, the concept of mindfulness-based self-efficacy has been the subject of recent investigations (Atalay, Bulgan, & Taylan, 2017; Chang, Palesh, Caldwell et al., 2004; Cayoun, Francis, Kasselis, & Skilbeck, 2012; Ozkan, Karatas, & Ergin, 2018) and is defined as the person's ability to maintain awareness without judgment in various situations (Chang et al., 2004). More broadly, mindfulness encompasses the monitoring of

inner experiences in the present moment via attention, being aware of the nature of this attention and admitting it without judgment (Kabat-Zin, 2015). This admittance contains the continuous observation of all body sensations, emotions, thoughts and their regulation (Bishop, Lau, Shapiro et al., 2004; Davidson, Kabat-Zinn, Schumacher et al., 2003; Nielsen & Kaszniak, 2006; Creswell, Way, Eisenberger, & Lieberman, 2007). Most studies show that mindfulness practices increase well-being, strengthen academic performance and decrease the stress levels (Hölzel, Lazar, Gard et al., 2011; Zenner, Herrnleben-Kurz, & Walach, 2014), since all body sensations, feelings and thoughts are taken as "simply" body sensations, feelings and thoughts – rather than stable features. Mindfulness practices especially help young people to concentrate on tasks. Concentration via focused attention may reduce anxiety and improve academic performance (Beauchemin, Hutchins, & Patterson, 2008; Franco, Mañas, Cangas, & Gallego, 2010), as well as foster curiosity and openness (Coffman, 2007; Siegel, 2007). In other words, mindful practices ensure individuals vitality and energy (Allen & Kiburz, 2012; Baer & Lykins, 2011; Brown & Ryan, 2003), since they learn to be open and engaged (Siegel, 2007). In this respect, mindfulness can be associated with thriving. Although many studies have indicated a relationship between mindfulness and thriving in various samples (workers, nurses) (Allen & Kiburz, 2012; Baer & Lykins, 2011; Brown & Ryan, 2003; Siegel, 2007; Şahin, Arıcı Özcan, & Arslan Babal, 2020), only a few studies (Tan & Martin, 2015; Warren, 2016) have looked at the relationship between mindfulness and thriving among adolescents. To bridge this gap, the current study aimed to examine the relationship between mindfulness practices and thriving in a sample of adolescents.

Thriving is a concept of positive psychology and has many different definitions depending on the specific sample and context of the study (Brown, Arnold, Fletcher, & Standage, 2017). Broadly, it can be defined as a psychological state that gives an individual the inner energy and confidence to learn certain skills or knowledge with greater enthusiasm (Nix, Ryan, Manly, & Deci, 1999; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). Most studies (Deci & Ryan, 2008; Spreitzer et al., 2005; Wallace, Butts, Johnson, Stevens, & Smith, 2016) indicate that those with thriving features navigate and regulate their internal sources and behaviours autonomously according to their basic psychological needs and contextual features. Thus, thriving allows individuals to assess their capabilities and improve themselves accordingly (Spreitzer et al., 2005), which might be beneficial while facing with difficulties and stressors. Specifically, thriving programs foster resource development among teens, giving them academic motivation and connection skills while decreasing their behaviour problems (Arnold, 2017; 2018; Arnold & Gagnon, 2019; DuBois & Keller, 2017; Lerner, Lerner, von Eye, Bowers, & Lewin-Bizan, 2011). In this sense, several researchers have emphasized the relationship between thriving and self-

efficacy – especially among adolescence (Deane, Harré, Moore, & Courtney, 2017; Hirschi, 2009; Scales, Benson, & Roehlkepartain, 2011).

All above-mentioned studies point to the importance of understanding human development from a strength-centred perspective. Focusing on personal resources instead of problems and inadequacies appears to be critical, while developing interventions to protect individuals against the risk factors (Bundick, Yeager, King, & Damon, 2010). Given the challenges regarding youth developmental issues, researchers have recognized the need to improve adolescents' well-being through effective intervention programs. "Positive Youth Development (PYD)" is one such programs developed to strengthen the internal and external resources of adolescences, such as their self-efficacy and self-regulation which have a great impact on maintenance and enhancement of their mental health (Lerner, Phelps, Forman, & Bowers, 2009; Lerner et al., 2011). In particular, Mindfulness-Based Stress Reduction Programs (MBSR) are effective in nurturing self-efficacy and self-regulation (Bishop et al., 2004; Caldwell et al., 2010), as well as reducing levels of stress and anxiety among adolescents (Chang et al., 2004; Blecharz et al., 2014; Malow & Austin, 2016; Sibinga, Kerrigan, Stewart et al., 2011). Furthermore, these programs have a significant role in the improvement of emotion regulation skills (Tacón, McComb, Caldera, & Randolph, 2003; Siegel, 2007), control perception (Astin, 1997), and awareness (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2005). Consequently, the enhancement of several different skills may play a critical role for adolescents to thrive with their life.

Most mindfulness studies have tended to examine mindfulness descriptively according to several variables, such as self-compassion (Ozyeşil, 2011), stress (Ülev, 2014) and social anxiety (Tuncer, 2017). Furthermore, the number of experimental studies is quite limited, and these limited studies mostly concentrated on the examination of stress (Demir, 2015, 2017) and emotion regulation (Demir & Gündoğan, 2018) among university students. A small number of studies, meanwhile, have focused on self-efficacy and mindfulness in high school students (Atalay et al., 2017; Ozkan et al., 2018). More specifically, no study has covered the concepts of perceived stress, mindfulness, self-efficacy and thriving among high-school students – especially those in the 11Th grade, who have the added pressure of university entrance exams. Therefore, the current study has aimed to examine the effects of MTP on high school students' perceived stress, mindfulness, and self-efficacy levels. The study tested the following hypotheses to reach these aims.

1 Hypotheses

H_1: MTP will be significantly more effective in decreasing the perceived stress levels of high school students in the experimental group than the control group; and this effect will be sustained in measurements to be conducted in two months following the completion of the program.
H_2: MTP will be significantly more effective in increasing mindfulness levels of high school students in the experimental group than the control group; and this effect will be sustained in measurements to be conducted in two months, following the completion of the program.
H_3: MTP will be significantly more effective in increasing thriving levels of high school students in the experimental group than control group; and this effect will be sustained in measurements to be conducted in two months following the completion of the program.
H_4: MTP will be significantly more effective in increasing self-efficacy levels of high school students in the experimental group than the control group; and this effect will be sustained in measurements to be conducted in two months following the completion of the program.

2 Method

2.1 Research design

The study examined the effects of MTP on high school student's perceived stress, mindfulness, thriving and self-efficacy levels. As seen below, the first factor shows the independent functional groups (experimental and control), while the other factor shows the repeated measurements (pre-test, post-test, follow up test) in various conditions, according to the dependent variable (Buyukozturk, 2006).

Table 1

Research pattern

Groups	*Pre-test*	*Intervention*	*Post-test*	*Follow up -test*
Experiment	PSS		PSS	PSS
	MAAS	(MTP)	MAAS	MAAS
	TS		TS	TS
	GSES		GSES	GSES
Control	PSS		PSS	PSS
	MAAS	No intervention	MAAS	MAAS
	TS		TS	TS
	GSES		GSES	GSES

PSS: Perceived Stress Scale, MAAS: Mindfulness Attention Awareness Scale, TS: Thriving Scale, GSES: General Self-Efficacy Scale

2.2 Participants

Participants were selected from among high school students receiving learning support at the Uskudar Municipality Youth Academy for the Fall semester of the 2019-2020 Academic Year. After consent was taken from the students and their families, 173 11th grade volunteers filled out perceived stress, mindfulness attention awareness, thriving and general self-efficacy scales. A total of 48 students who received higher than average scores in PSS ($\bar{X}$=43.91) (Sd=5.29), and lower scores than average in MAAS ($\bar{X}$=54.87, Sd=11.02.), TS ($\bar{X}$=34.02, Sd=5.97.) and GSES ($\bar{X}$=28.84, Sd=5.42) were selected. 17 of 48 students volunteered to participate in the study. Later, these seventeen female students were randomly assigned to the experimental and control groups. The mean age of the experimental group was 16.62 (Sd=.51), while the control group had a mean of 16.77 (Sd=.41).

2.3 Data collection instruments

4.3.1 Perceived stress scale (PSS)

Perceived stress scale (PSS): Developed by Cohen, Kamarck, and Mermelstein (1983), this scale was later adapted into Turkish by Eskin, Harlak, Demirkiran and Dereboy (2013), and it aims to assess an individual's perceived stress level. The scale is composed of 14 items on a 5-Likert type scale and includes two sub-dimensions - namely perceived insufficient self-efficacy and perceived stress/distress. The item factor loads for perceived insufficient self-efficacy dimension ranged from .44 to .76 whereas it was between .18 and .74 for perceived stress/distress dimension. The internal consistency coefficient and test-retest reliability were quite high (.84 and .87, respectively). In this study, the internal consistency coefficient for the entire scale came to .84.

4.3.2 Mindfulness attention awareness scale

Mindfulness attention awareness scale (MAAS; Brown, West, Loverich, & Biegel, 2011): This is a 14-item self-report questionnaire that uses a 6-Likert type scale and measures the respondent's receptive state of attention, observation, and awareness to the present and immediate experiences of adolescents between the ages of 14 and 18. The Turkish version was adapted by and Aydın-Sünbül and Yerin Güneri (2019). The internal consistency indicators of Cronbach alpha and test-retest reliability were 0.82 and 0.79, respectively (Brown et al., 2011). The Cronbach alpha of the Turkish version of the scale came to 0.81. The results of a confirmatory factor analysis supported the single factor structure of MAAS-A (χ2=162.5, df=75, χ2/df=2.17; GFI=0.94, CFI=0.92; TLI=.90; RMSEA=0.06). In this study, the Cronbach's alpha coefficient for the entire scale was valued at 81.4.

4.3.3 Thriving scale

Thriving scale (TS; Porath, Spreitzer, Gibson, & Garnett, 2012): The thriving scale, composed of 10 items on a 6-point Likert-type scale, was adapted into Turkish by Arici-Ozcan, Sahin, and Cankir (2020) to measure the respondent's level of thriving. It has two factors referring to vitality and learning. The scale's overall internal consistency was 0.92 for a young adult sample and 0.88 for a young professional sample (Porath et al., 2012). The model of thriving based on two-dimensions, namely learning and vitality, fit the data well at T1 ($\chi 2$=214,928 df=133, CFI=0.981, IFI=982, RMSEA=0.077, SRMR=0.046). The Cronbach's alpha coefficient for this scale was .70 and the test-retest reliability coefficient for a 6-week interval has reached to .77. The Cronbach alpha's coefficient for this study came to .76.

4.3.4 General self-efficacy scale

General self-efficacy scale (GSES; Schwarzer & Jerusalem, 1995): Revised in 1995 as a self-report scale, the GSES consists of 10 items based on a 4-point Likert-type scale. It is used to measure general self-efficacy and has been translated into 25 languages. The Cronbach's alpha coefficient for the entire scale was .86. (Scholz, Doña, Sud, & Schwarzer, 2002). The Turkish version of the scale was adapted and validated by Aypay (2010) and revealed a two-factor structure, namely "effort and resistance" in addition to "ability and confidence." As a result of the factor analysis of Turkish version, two factors, which explain 47% of the total variance and whose eigenvalue is greater than 1, were obtained. The factor load values of the items in the first factor are between .45 and .72. The factor load values of the items in the second factor are between .56 and .79. The internal consistency of the scale in total was .83, with alpha for the two factors ranging from .79 to .63, respectively. The test-retest reliability scales were .80. For the current study, the Cronbach's alpha coefficient for the entire scale came to .84.

2.4 The scope of MTP in high school students

The program, developed by the researcher, was organized as a psychological intervention group program to increase mindfulness, thriving and self-efficacy levels and decrease perceived stress of high school students. Firstly, the researcher examined the literature in terms of the theoretical definitions of perceived stress, mindfulness, thriving and self-efficacy, in addition to the intervention programs based on these four concepts (Blecharz et al., 2014; Deane et al., 2017; Hirschi, 2009; Malow & Austin, 2016; Scales et al., 2011; Sibinga et al., 2011; Siegel, 2007; Tacón et al., 2003). Previous research reveals that these four concepts are based on self-regulation (Deci & Ryan, 2008; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2006; Greason & Cashwell, 2009; Shapiro, Carlson, Astin, & Freedman, 2006; Spreitzer et al., 2005; Wallace et al., 2016). Accordingly, the researcher developed the mindfulness-

based thriving program as in line with the self-regulation theory (Shapiro & Schwartz, 2000). Self-regulation is the ability to consciously monitor and control the individual's own thoughts, behaviours, emotions, and bodily sensations, and can be developed through attention exercises (Shapiro & Schwartz, 2000). Thus, the mindfulness-based thriving program involves awareness of bodily sensations, emotions, thoughts, behaviours, and their regulation, sequentially.

2.5 The content of MTP

MTPs for high school students refer to a six-week psychological intervention group program composed of 90-minute sessions once a week. Each session involves three activities, each activity lasting approximately 20 minutes. All sessions include a warming up, mindfulness-based thriving, and a closure activity. One of the sample activities for warming up is "Settling and Seeing". In this activity, the participants notice and sense the ground they sit and realize what their eyes attract attention in their environment. An example of the mindfulness based thriving activities is called "Changing Balls". The participants think about a stressful event they experienced during the previous week before picking a ball representing this stress among the coloured shrinking balls. They then observe their senses and feelings while holding the ball in their hand. The same procedure is applied to dwell on positive events, as well. Later, the activity ends with group members' sharing their experience. A third sample of the activities regarding the closure in a positive way is named as "Settling Experience". Participants are asked to close their eyes and feel the ground they sit to realize their past experiences of here and now. Consequently, they can place these sensations in their bodies. Table 2 summarizes the topics in each of the sessions.

Table 2

Mindfulness based thriving program in high school students

Session	
1st	▪ Meeting, group cohesion
	▪ Noticing the place with being conscious
	▪ Determining group rules and group purpose
2nd	▪ Noticing the body with consciousness and discovering bodily resources
	▪ Talking about daily problems to-do with consciousness
	▪ Becoming aware of body sensations when talking about the daily problems
	▪ Using bodily resources when speaking about daily problems
3rd	▪ Noticing the feelings with conscious and discovering feeling resources
	▪ Becoming aware of their feelings when speaking about problems
	▪ Monitoring and handling with these emotions when speaking about a problem
	▪ Utilizing feeling resources when talking about a problem

4th	▪ Noticing the thoughts with conscious and discovering thought resources ▪ Becoming aware of their thoughts when speaking about a problem ▪ Monitoring and handling with these thoughts when talking about a problem ▪ Utilizing resources of thoughts when talking about a problem
5th	▪ Noticing the behaviours with conscious and discovering behaviour resources ▪ Becoming aware of their behaviour when talking about a problem ▪ Noticing the borders that protect themselves against a problem ▪ Utilizing behavioural resources when speaking about a problem
6th	▪ Noticing their integrity here and now ▪ Covering what they have learnt during the sessions ▪ Finishing the program with positive group feedback

2.6 Data analysis

After ethical permission was approved from the Ethical Committee in Istanbul Medeniyet University. A preliminary analysis was conducted using the pre-test scores of the PSS, MAAS, TS and GSESs collected from the participants of the experimental and control groups to determine the test type (parametric or non-parametric) for the main analysis of the data. According to the results of a preliminary analysis, the data was homogeneous and distributed typically. A two-way ANOVA for repeated measurements with a 2x3 design was used to display the statistical significance of the change in pre-test, post-test and follow-up tests, as this is a more appropriate method for split-plot (mixed) designs (Buyukozturk, 2006). Later, the data was examined using the Tukey (HSD) test to identify the mean scores that are significantly different from each other. All statistical analyses were completed using IBM SPSS Statistics 23 and computed at $p \leq .05$ and $p \leq .01$.

3 Results

3.1 Results on preliminary analysis

The data set was checked for the homogeneity and normality before statistical analyses. According to the parametric test results of the pre-test measurements, there were no significant differences among the mean scores of PSS ($F(1\text{-}15)=.2.276$, $p>.05$), MAAS ($F(1\text{-}15)=1.605$, $p>.05$), TS ($F(1\text{-}15)=.674$ $p>.05$) and GSES ($F(1\text{-}15)=.358$ $p>.05$). Furthermore, the Kolmogorov-Smirnov test of the PSS (.212, $p>.05$), MAAS (.180, $p>.05$), TS (.167, $p>.05$) and GSES (.131 $p>.05$) came to a measure larger than (p) .05 (Buyukozturk, 2006). Additionally, the skewness and kurtosis level gathered from the scores of both the experimental and control groups in pre-test measurements on each of the three scales came to between +1 and -1, which indicates a normal distribution.

3.2 Descriptive statistics for the experimental and control groups

The arithmetic mean scores and standard deviations for all scales as a function of groups and measurements are presented in Table 3.

Table 3

Arithmetic average and standard deviation values of experimental and control groups

	Measurement	Pre-test		Post-test		Follow up -test	
		$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd
Perceived Stress Scale	Experiment (N=8)	45.25	2.18	29.37	4.27	27.37	4.09
	Control (N=9)	47	2.54	47.66	2.34	46.77	2.22
Mindfulness Attention Scale	Experiment (N=8)	43.37	4.56	58.00	4.14	58.37	2.16
	Control (N=9)	41.22	2.16	42.22	2.16	46.00	4.09
Thriving Scale	Experiment (N=12)	29.75	2.71	44.62	2.5	48.62	4.18
	Control (N=12)	28.77	2.16	27.55	1.74	28	2.18
General Self-Efficacy Scale	Experiment (N=12)	24.87	2.29	45.62	2.77	47.25	2.18
	Control (N=12)	23.66	5.26	22.88	3.48	23.88	3.85

In light of Table 3, the pre-test averages for the experimental and control groups were observed as equivalent, while there showed differences between the post-tests and follow up tests of either group in all the scales. Given the differences revealed in the descriptive statistics, all hypotheses were tested using a two-step procedure. First, a series of two-way repeated measures, ANOVA, were conducted on the PSS, MAAS, TS, and GSES scores to determine the differences between the experiment and control groups at the end of the intervention process. Following the ANOVA results, Tukey's test was performed for each of the scales to make comparisons among the mean scores for significant F values.

3.3 Results on hypothesis on decreasing perceived stress

PSS scores were analysed with a 2 (Group: Experiment vs. Control) x 3 (Measurement: Pre-test, Post-test, Follow up test) repeated measures ANOVA, as shown in Table 4.

Table 4

Variance analysis results of two factors on experimental and control groups' PSS scores

Source	Sum of Squares	Sd	Average of Squares	F	p	Eta Square
Between groups	83668.514	14				
Group (E/C)	2196.514	1	219.514	106.487	.000	.877
Error	309.407	15	20.627			

Within groups	1876.052	17				
Measurement (pre-post-follow up)	800.680	1	400.340	48.546	.000	.764
Group*Measurement	827.974	1	413.987	50.201	.000	.770
Error	247.398	15	8.247			

The group effect for the PSS scale was found to be significant ($F(1-15)=106.487$, $p<.01$). Irrespective of the test types, there were significant differences between the average PSS scores of the experimental and control groups. Similarly, there were significant differences ($F(2-15)=31.194$, $p<.01$) between the average PSS scores of individuals gathered from pre-test, post-test, and follow up tests, regardless of the group type. Furthermore, there was a significant interaction between group and measurement, such that ($F(2-15)=34.03$, $p<.01$) the change in the scores of individuals on the PSS scale over the pre-test, post-test and follow up measurements varied depending on the group type.

Following the significant ANOVA results, a Tukey test was performed to display the significant pairwise comparisons. Post-hoc comparisons using the Tukey HSD test revealed that, as hypothesized, the pre-test mean scores of the individuals in the experimental group were 15.88 points higher than their post-test average scores ($p<.01$) and 17.88 points higher than their average follow up test scores ($p<.05$). Furthermore, post-hoc comparisons using the Tukey HSD test showed that the post-test mean scores of the individuals in the experimental group were –18.29 points lower than their post-test average scores in the control group ($p<.01$) and the follow up test mean scores of the individuals in the experimental group were – 19.4 points lower than the follow-up test average scores of the control group ($p<.05$). However, the mean differences between the pre-test and post-test, follow up test scores for the control group were not significant ($p>.05$). Thus, it can be stated that the MTP caused a significant decrease in perceived stress levels for the experimental group.

3.4 Results on hypothesis on increasing mindfulness

MAAS scores were analysed with a 2 (Group: Experiment vs. Control) x 3 (Measurement: Pre-test, Post-test, Follow up test) repeated measures ANOVA, as displayed in Table 5.

Table 5

Variance analysis results of two factors on experimental and control groups' MAAS scores

Source	*Sum of Squares*	*Sd*	*Average of Squares*	*F*	*P*	*Eta Square*
Between groups	117662,798	14				
Group (E/C)	1428.132	1	1428.13	37.24	.000	.713
Error	575.241	15	38.34			
Within groups	1645.791	17				
Measurement (pre-post- follow up)	905.752	1	452.876	57.66	.000	.794
Group*Measurement	504.419	1	252.209	32.11	.000	.682
Error	235.620	15	7.85			

The main effect of the group on the MAAS scores were significant ($F(1\text{-}15)=37.24$, $p<.01$). Without discriminating between pre-test, post-test and follow up test scores, a significant difference between the MAAS average scores of the experiment and control groups can be observed. Similarly, the main effect of the measurement was also significant ($F(2\text{-}15)=57.66$, $p<.01$). Regardless of the group type, the MAAS scores of each individual changed over the course of the measurement process. Furthermore, the interaction effect (group*measurement) appeared to be significant ($F(2\text{-}15)=32.11$, $p<.01$), which showed that the change in the MAAS scores over the measurement process (pre-test, post-test, follow up test) varied according to group type (experimental or control).

Following the significant interaction effect, a Tukey test was performed to identify the significant pairwise comparisons. The Tukey post-hoc comparisons indicated that while scores for the control group did not display a significant change during the pre-test, post-test and follow up test ($p>.05$), there was a significant increase in the average scores of the MAAS over the experimental process for the experimental group. The pre-test mean scores of the individuals in the experimental group were 14.63 points lower than their post-test average scores ($p<.01$) and 15 points lower than their average follow up test scores ($p<.01$). Furthermore, post-hoc comparisons using the Tukey HSD test showed that the post-test mean scores of the individuals in the experimental group were 15.78 points higher than their post-test average scores in the control group ($p<.01$) and the follow up test mean scores of the individuals in the experimental group were 12.37 points higher than their follow-up test average scores in the control group ($p<.01$). As in line with the second hypothesis, the MP was significantly efficient in increasing the mindfulness levels of the experimental group.

3.5 Results on hypotheses on increasing thriving level

The TS scores were analysed with a 2 (Group: Experiment vs. Control) x 3 (Measurement: Pre-test, Post-test, follow up test) repeated measures ANOVA, as presented in Table 6.

Table 6

Variance analysis results of two factors on experimental and control groups' TS scores

Source	Sum of Squares	Sd	Average of Squares	F	P	Eta Square
Between groups	60687.686	14				
Group (E//C)	2110.745	1	2110.745	184.07	.000	.925
Error	172.000	15	11.46			
Within groups	1875.364	17				
Measurement (pre-post-follow up)	753.403	1	366.702	58.54	.000	.796
Group*Measurement	928.933	1	464.467	72.186	.000	.828
Error	193.028	15	6.34			

The results revealed that the group effect on TS scores was significant ($F(1-15)=184.07$; $p<.01$). Irrespective of measurement type, significant differences emerged between the experimental and control groups' average scores on the TS. Likewise, the effect of the measurement was also significant ($F(2-15)=58.54$, $p<.01$), indicating a difference between pre-test, post-test and follow up test for the TS scores. Furthermore, it was seen that value gathered from the examination of common effect (group*measurement) was significant ($F(2-15)=72.186$, $p<.01$). In other words, the difference between the average scores of the experimental and control groups changed depending on the measurement process.

Following the significant ANOVA results, a Tukey test was performed to display the significant pairwise comparisons. Tukey post hoc comparisons indicated that the pre-test mean scores of the individuals in the experimental group were 14.87 points lower than their post-test average scores ($p<.01$), as well as 18.87 points lower than their average follow up test scores ($p<.01$), verifying the third hypothesis of the study. Furthermore, post-hoc comparisons using the Tukey HSD test showed that the post-test mean scores of the individuals in the experimental group were 17.07 points higher than their post-test average scores in the control group ($p<.01$) and the follow up test mean scores of the individuals in the experimental group ended 20.62 points higher than their follow up test average scores in the control group ($p<.01$). However, the mean differences among the pre-test, post-test and follow up test scores for the control group were not significant ($p>.05$). In other words, MTP was

significantly efficient in increasing the mindfulness levels of the experimental group.

3.6 Results on hypotheses on increasing self-efficacy level

GSES scores were analysed with a 2 (Group: Experiment vs. Control) x 3 (Measurement: Pre-test, Post-test, Follow up test) repeated measures ANOVA, as shown in Table 7.

Table 7

Variance analysis results of two factors on experimental and control groups' GSES scores

Source	Sum of Squares	*Sd*	Average of Squares	*F*	*p*	Eta Square
Between groups	50000.681	14				
Group (E//C)	3159.269	1	3159.269	191.284	.000	.873
Error	460.574	15	17.476			
Within groups	3058.667	17				
Measurement (pre-post-follow up)	1293.762	1	681.024	191.284	.000	.927
Group*Measurement	1347.644	1	673.822	199.250	.000	.7930
Error	101.454	15	3.382			

Based on the ANOVA results, the group effect was found to be significant ($F(1\text{-}15)=191.284$, $p<.01$). Regardless of pre-test, post-test and follow-up measurements, significant differences emerged between the average scores of experimental and control groups on the GSES. Similarly, there was a main significant effect of the measurement type on the average scores of individuals ($F(2\text{-}15)=191.284$; $p<.01$). These main effects were qualified by a significant interaction between group and measurement ($F(2\text{-}15)=199.25$; $p<.01$). This outcome indicated that the effect of group type of average GSES scores differed depending on the pre-test, post-test and follow-up measurements.

Given the significant interaction in the ANOVA results, a Tukey test was conducted to identify which groups were significantly different from others. The Tukey post-hoc comparisons indicated that the pre-test mean scores of individuals in the experimental group were 20.75 points lower than their post-test average scores ($p<.01$) and 22.38 points lower than their average follow-up test scores ($p<.01$). Furthermore, post-hoc comparisons using the Tukey HSD test showed that the post-test mean scores of individuals in the experimental group were 22.74 points higher than their post-test average scores in the control group ($p<.01$), while the follow-up test mean scores of individuals in the experimental group were 23.37 points higher than their follow-up test averages in the control group ($p<.01$). However, the mean differences between the pre-test, post-test and follow up test scores for the control group were not significant

($p>.05$). Verifying the fourth hypothesis, the MTP was effective in increasing the self-efficacy levels of the experimental group compared to the control group.

4 Discussion and conclusion

The main objective of the current study was to understand the effects of the MTP on adolescents with a higher level of perceived stress. The results of this study suggested that the 6-week MTP applied to adolescents was significantly effective in decreasing perceived stress and increasing mindfulness, thriving and self-efficacy levels.

According to the first result of this study, the implementation of a 6-week MTP was significantly effective in decreasing perceived stress levels among adolescents. This result was supportive of the earlier research showing that MBSR reduces stress and anxiety in adolescents (Bergen-Cico, Possemato, & Cheon, 2013; Malow & Austin, 2016; Demir, 2015; 2017; Kuyken, Weare, Ukoumunne et al., 2013). Barkan and his colleagues (2016) stated that mindfulness was also related to individual characteristics, such as openness and agreeableness, as well as awareness. In that regard, thriving also appears a related concept. Several studies (Arnold, 2017; 2018; Arnold & Gagnon, 2019; DuBois & Keller, 2017; Gerson & Fernandez, 2013) indicated the role of thriving-based programs in reducing stress among adolescents. Hence, it is possible to develop more comprehensive and effective programs by combining the elements of mindfulness and thriving in one study.

The second finding indicated that MTP was significantly effective in increasing the mindfulness levels of adolescents, which was compatible with the results of previous studies (Ames, Richardson, Payne, Smith, & Leigh, 2014; Atalay et al., 2017; Huppert & Johnson, 2010). This study is the first to integrate thriving into a mindfulness program and was effective in increasing the mindfulness level of adolescents.

The third finding further suggested that MTP was significantly effective in increasing the thriving level of adolescents. As expected, thriving programs (Arnold, 2017, 2018; Arnold & Gagnon, 2019; DuBois & Keller, 2017; Lerner et al., 2009, Lerner et al., 2011) are effective in increasing the adolescences' thriving level. Although previous research examined the relationship between mindfulness and thriving (Allen & Kiburz, 2012; Baer & Lykins, 2011; Şahin et al., 2020; Tan & Martin, 2015; Warren, 2016) for various samples (workers, nurses, adolescence), no experimental studies were shown to be effective in increasing the thriving level of adolescents.

Similarly, our last finding showed that MTP was significantly effective in increasing the self-efficacy level of adolescents. This finding was in line with the studies indicating the role of mindfulness (Atalay et al., 2017; Blecharz et al., 2014; Ozkan et al., 2018; Pepping, Duvenage, Cronin, & Lyons, 2016) and thriving programs (Arnold, 2017, 2018; Arnold & Gagnon, 2019; DuBois &

Keller, 2017; Gerson & Fernandez, 2013) in reducing stress as well as improving self-efficacy in adolescence.

Considering all these mentioned statements, this study has a number of important contributions. First, MTP bridges an important gap in literature, especially regarding self-efficacy. As Cicognani (2011) states, adolescents' perception of self-efficacy plays a critical role in the construction of their personality and strategies to cope with the challenges they face. This study makes a crucial contribution by explaining that both thriving and mindfulness has an important role in the development of self-efficacy during adolescence. Most such thriving and mindfulness practices that exist in the literature have their basis in adult-based practices. Since adolescents have less developed memories and attention skills compared to older subjects, modifications are required accordingly (Posner & Petersen, 1990). The program applied in this study differs from that featured in the literature, in this respect, and its content is arranged in accordance with the developmental process of the adolescence. The unique features that distinguish this program from other applications mainly concern its mindfulness and thriving basis, eclectic theoretical framework and a multi-structural nature that presents elements aimed at supporting adolescent development through a biopsychosocial model. The program is structured and is open for the benefit of specialists working in the field, including those based in schools, training centres, and guidance centres. Thanks to its holistic perspective and adolescent focus, the program provides a unique contribution to the literature.

Despite the contribution of this research, there were some limitations. The first concerns the scores obtained from the scales. Data were collected via self-report questionnaires so that social desirability may have effect on the research. Secondly, the sample is composed of only 11th grade female students, which limits the generalizability of the results. Therefore, this research can be tested on more diverse and heterogeneous gender adolescent groups. Third, the current study only contained experimental and control groups. Henceforth, adding a placebo group would increase the reliability of the results. Fourth, a single program was applied to the participants with no comparison having been made to a different program. Thus, a practical comparison with other programs in the literature would enhance the validity of these findings. Finally, the results obtained at the end of the 6-week program were compared with the results of two months after the program and the effect was evaluated. Lack of a follow up of this effect at certain intervals can thus also be counted among the study's limitations.

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The Relationship between Waldorf Pedagogy and Information and Communication Technologies in Hungary

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Abstract:
Introduction: The number of two-to three-year-old children using mobile phones was 10% in 2013 compared to 40% in 2017 (Konok, Bunford, & Miklósi, 2020). Several theoretical and empirical studies deal with the didactics of using modern technology in the classroom. Most studies highlight the neutral (Zsolnai, 2017) or positive impact of using ICT in the classroom. Only a few address the negative effects of digitally enhanced learning (Dávila, Casabayó, & Rayburn, 2018; Livingstone, 2012; Lorenzo & Trujillo, 2018). State education has continually tried to integrate modern technology with education, but there are also examples of institutional restrictions on its use and even a total ban can also be found.
Purpose: This study provides an overview of the pedagogical and epistemological reasons why Waldorf pedagogy and Waldorf Steiner schools take a critical approach to the use of information and communication technologies (ICT) and to "screens" in general, together with mapping out the current state of Waldorf schools in Hungary.
Methods: In the present study, we applied source analysis as a traditional research method in the philosophy of education.
Conclusions: The findings show that the institutional use of information and communication technologies entirely contradicts the basis, tasks and spirit of Waldorf pedagogy. If we look at the epistemology and anthroposophical anthropology of Waldorf pedagogy, we can see that the autonomy of a Waldorf teacher is not limitless, and so a continuous practical and theoretical responsibility of the Waldorf movement and Waldorf teachers is to establish and uphold coherence between the practices of every Waldorf institution and Waldorf pedagogy.

Key words: epistemology, ICT, Waldorf pedagogy, ICT negative impact on pedagogy, Rudolf Steiner.

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Introduction: Waldorf schools in Hungary at present

The question should not be: What does a human being need to know and be able to do for the social order that now exists?, but rather: What capacities are latent in this human being, and what lies within that can be developed? (Steiner, 1985, p. 72)

Globally, Waldorf Kindergartens and Schools are partially state funded. In Hungary, this guarantees that, by law (Section 31 (2) and Section 9 (8) of Act on National Public Education), a Waldorf institution, just like any other independent school, can embrace an ideology, and consequently, the school can base its admission policy around this. Waldorf schools are not required by law to admit everyone, and in this respect, they are not an institution that offers public service. They are also more self-reliant than state-funded institutions with regards to management and governance. According to this position and their pedagogical theory, these institutions check not only a child's cognitive skills during the admission procedure (e.g. learning assessments) but all elements of the individual's complexity in equal measures, including affective, cognitive, motor and social skills as well as the parenting style of the family and the predictable level of cooperation between the family and the pedagogy of the school. They also aim to continue to shape these factors later on. Such schools allow for the transition between their own educational structure and mainstream schools at any time during the learning process. In Hungary, these schools are defined as public primary and secondary schools of Art, all following the Waldorf Curriculum accredited by law 13 years ago. The first twelve years are divided into Lower, Middle and Upper schools, and which each lasting for four years, are followed by another year wholly dedicated to preparing for the Matura, or State Examination.

Steiner Waldorf education is the most widespread progressive educational movement in the world. There are about 3000 Waldorf Steiner Schools and Kindergartens around the globe. According to a 2019 survey, 2154 are located in Europe (https://bit.ly/2JFxyBe). Hungary is always the third or fourth in the list of countries with the most Waldorf schools per capita every year, and other progressive education movements (value mediation and skills development pedagogy, Montessori, Dalton, Freinet, Jean-Plan, Rogers, independent) comprise about half the number of Waldorf schools altogether. This success is the result of the originality of the Waldorf school method[1], its outstanding achievements in certain areas (Sobo, 2015), its considerable and growing reputation, its own Teacher Training Courses[2], its effective protection of

[1] Certain conceptions influence each other, for example Maria Montessori's definition of „cosmic education" Frierson (2014).

[2] Professor Emerita Zsuzsa Mesterházi, who is the ex-leader of the Doctoral School of Education at the Faculty of Special Educational Needs at ELTE, founded the Faculty of Waldorf Teacher Training Programme in Hungary in 1990, and directed it for a long time at Bárczi Gusztáv Faculty of Special Educational Needs. Tamás Vekerdy who was one of the teachers and founders of the Solymár Waldorf Teacher Training

interests and educational services, and of its everyday contributions made by its teachers and parents. In 2019 the number of children attending the one hundred Waldorf Schools or Kindergartens in Hungary was 8500, and more than 9000 in 2020, comprising 0.6% of the total number of children, 1 469 000, participating in education in Hungary. In recent years, there has been such a constantly increasing initiative to found Waldorf schools in the country that these schools continually lack Waldorf trained teachers, but the rate of oversubscription is high every year. This increase in numbers and popularity is the result of not just the pedagogy itself, but of a loss of trust in mainstream education, caused by the increasing political attacks on state education since 2010 (Kopasz & Boda, 2018). Hungarian Waldorf Steiner Schools thus have to face several challenges:

1. Most parents first meet Waldorf pedagogy during their children's school years, and this is the period when they start to appreciate its principles which demands continual conversation between the participants and a high level of professional and communicational skills from the teachers.
2. The growing number of schools does not necessarily go hand in hand with a growing number of trained teachers[3] and the legitimacy of a Waldorf Teacher Certificate not based on the traditional teacher training programme can be limited, because teachers who only hold this qualification might acquire a one-sided pedagogical-professional knowledge and approach.
3. Schools have to face a more and more restricted legal system, tightening regulations, and increasing difficulties in the protection of interests through one body.
4. Waldorf pedagogy and Constructivist pedagogy are blurred: alternative, eclectic schools are founded as Waldorf schools, or Waldorf schools are exclusively interpreted as independent, innovative and alternative school models (Steiner, 2004, pp. 103-104).
5. The rhetoric of sharp and generalised criticism against mainstream education as a self-defining element of the social status and role of Waldorf schools.
6. Pedagogical and epistemological subjectivism is attributed to Waldorf pedagogy (and such practices are promoted) in spite of being totally contradictory to its groundings (Steiner, 1928, pp. 38-84).
7. There is a debate around the question on the use of information and communication technologies in the classroom, often kept within the

Programme, spent his life popularising alternative schools and the Waldorf pedagogy. Zoltán Döbröntei founded Napút Art Academy in 2007, which organises painting courses based on anthroposophy. He also led a community working, learning and creating together for 10 years, apart from his performing, lecturing and publishing career. Waldorf schools include some specific subjects, such as Bothmer gym and Eurythmy. László Baditz, Ildikó Szántó and László Varga-Szemes founded the Bothmer Movement Training in 1995. Mária Scheily and Clemens Schleuning started Eurythmy Teacher Training in 1992.

[3] 47% of Waldorf teachers in Hungary have a Waldorf Teacher Training Certificate and 51% in international research studies. Schools are trying to compensate for, or overcome, these shortcomings by sending teachers to workshops or on postgraduate courses.

conceptual framework of "dogmatism vs. innovation" in the Waldorf movement.

1 Rudolf Steiner's anthroposophy

At the turn of the nineteenth and twentieth century, there had been a growing demand for a human science suitable for establishing principles equal to those in the natural sciences, and for an epistemology to serve as the basis for an exact distinction between the human and natural sciences, which had been opposed to each other since the time of David Hume and John Stuart Mill. Human science, having surpassed descriptive psychology, was standing on the groundwork of hermeneutics and anti-psychology in the 1890s, when human sciences were aiming to examine and reveal the objectified spirit after the discussion of the individual in the earlier times, stating also that life is not, or not entirely, a psychological reality and that fully grasping its purpose should be sought outside individual life. The late Wilhelm Dilthey wished to present the basis and legitimacy of the human science conveying a universal knowledge generated from direct experience that is able to overcome the subjectivity of the experience and to provide purpose of life; but he could not identify with subordinating the human being into massive constructions, which seemed contradictory to the image of a free, irrational individual being:

It seems impossible to me that there could be a metaphysics which would attempt to conclusively express the world's coherency by using an interconnection of concepts (…) I merely adhere to the movement which, since the second half of the eighteenth century, has continued to negate metaphysics, as understood in the sense given above - Letter from Wilhelm Dilthey to Edmund Husserl (1911, Husserl, 1981, p. 203).

When researching spiritual truths, the logos, body language, productions and patterns of behaviour are to be understood instead of the processes of intelligence, feelings and the will in the individual:

The subjects of all statements in these studies are socially interrelated, individual selves. These are, first of all, single persons. Gestures, words, and acts are their manifestations. The problem of the human studies is to relive these selves and to grasp them in thought (1907, Dilthey, 1969, p. 2).

While modern sciences were being established and improved, there was less possibility for specialised scientists to examine their questions from a broader, philosophical perspective. Approaching a problem from an overall scientific and epistemological view has been highly valued since the turn of the century. Thinking about adopting the methodology of natural sciences for human sciences was considered alongside the tendencies and trends of the era (Durkheim, 1982; Neurath, 1936), as well as Rudolf Steiner's epistemological conceptions (Steiner, 1995, 1997), who was well acquainted with scientific ideas and his fellow thinkers (Steiner, 1981) and was then considering working for an academy at the beginning of his career:

Thus, our rule implies no metaphysical conception, no speculation about the innermost depth of being. What it demands is that the sociologist should assume the state of mind of physicists, chemists and physiologists when they venture into an as yet unexplored area of their scientific field (1893, Durkheim, 1982, p. 37).
It is the intent of spiritual science to free the methods and attitudes of scientific research from their particular application to the relationships and processes of sensory facts while preserving their way of thinking and other attributes (1910, Steiner, 1997, p. 14).
Some results of introspective observation following the methods of Natural Science (Steiner, 1967).
The realms of life are many. For each, specific sciences develop. But life itself is a unity, and the more the sciences busily immerse themselves in separate realms, the farther they move away from seeing the living wholeness of the world. There must be a kind of knowing that seeks, in the separate sciences, the elements that lead human beings back to full life again. A scientific specialist wants to become aware of the world and how it works through his or her insights. In this book, the goal is philosophical: science itself is to become organically alive. The separate sciences are preludes to the science attempted here (Steiner, 1995, p. 256).
The purpose of this new encyclopaedia, which is only an addition to other encyclopaedias, is to give all men a common starting-point of knowledge, to make one united science, forming a connection between the special sciences and putting together the work of different nations, to give simple and clear accounts of everything as a solid base for our thoughts and our acts, and to make us fully conscious of conditions in which we are living (Neurath, 1936, p. 111).

In The Philosophy of Freedom, Rudolf Steiner outlined a way to knowledge which placed thinking at its centre (Dahlin, 2009). Steiner expanded Goethe's methodology, which rejects teleology and views evolution as a metamorphosis (Park & Song, 2018) and renders thinking and fantasy to observation, with the hierarchy of systems theory embedded in the conceptual world of his era. He perceived all phenomena as creature-like spirits, from the natural world to human beings, and further up to the planets and stars. He declared that he examined the laws of not just the life hierarchies below the life spheres of the mechanical, observing subject; but the laws of the life hierarchies above the life spheres of the live, observing subject. Steiner thought that all entities, from the natural world to humans, and to the stellar system, were objective spirits falling into their appropriate hierarchical categories.

Consequently, their level of perception, being also hierarchical, and the strength of the developing cognition, become decisive in the question of how much of the whole reality can be perceived, and furthermore, how much can be considered natural phenomena and coherence based on scientific, or casual relationships. Just like Neoplatonism and Gnosticism, Steiner correlated the supreme with the world, structured it, and placed it into the categories of phenomena. Steiner

considered the development of morality, and not the development of science in the sense we would use it today, as the basis and as an absolute necessary condition for individual and social development. Steiner gave anthroposophy a scientific direction and approach in the modern sense, with extended methods, and also defined it with methodological, empirical, and straightforward experience-based characteristics (Steiner, 2003, pp. 7-31).

Steiner, as a philosopher, belonged to the tradition according to which reality can be grasped as an observation which is an interplay between thinking and perception: thinking makes an imperfect and fragmented perception indicating distinctive existences complete in the conceptual world. Observation, in Steiner's view, can be extended beyond the immediate realms of perception, because thinking which converts itself into its own object of observation can direct human cognition toward a complex and objective reality (Steiner, 1995). According to the starting point of epistemology, the human being in anthroposophy is at the same time a finite natural (perceptive) and a free spiritual (thinking) being, who as part of the latter quality does not just get acquainted with, but also, creates the world, which does not manifest itself as a closed system. As a finite natural being, a person's ability to surpass themselves basically depends not on the technological, but on their moral development (Steiner, 2011). Rudolf Steiner's anthroposophical spiritual science is relevant in intellectual history, but:

1) it does not use the language of philosophy or another discipline;
2) it was criticised in the beginning on the basis that its theories were not original (Steiner, 2006, pp. 199-213):

Question to Steiner: I got hold of a brochure written by a certain Herr Hauer. I suppose you read it and you know about it. This man states that you do not say anything new, everything that can be found in the doctrines of anthroposophy is already heard of, everybody knows it. Answer by Steiner: Naturally, ancient wisdom can be found, made available, one part of it here and another there. And on this basis, Herr Hauer read parts here and others there, and gained knowledge about it - but this is not how I have acquired my knowledge about it - and he draws the consequence: 'Steiner only states what we can find already written by other thinkers. 'This how we become at the mercy of this kind of people. When Herr Hauer should give an opinion on my doctrines, he goes on saying: 'But Steiner says nothing new!' If I were about to write a book on Geometry, I should explain Pythagorean theorem; although Pythagoras discovered it in 600 BC. If I were to develop new theories, I should still include this theorem, as well. You cannot reproach somebody for mentioning something that has already been known when people have forgotten about it at the time. This is how it happens that, what spiritual science states today, but in a different way, because it is indeed formulated differently, can be found in Gnostic writings, who were the writers of an earlier age. Gnostics wrote about ancient

wisdom and overtook it as it was, but their knowledge was not permeated with science gained by thinking, like in anthroposophy.

3) its thinkers cannot come up with a methodology valued in a scientific sense or with research study results, with a few, exceptional cases (Hauschka, 2002a, 2002b; Páleš, 2009).

It remained on the level of marginality and exclusivity and was rarely canonical in the academic circles. Only a few empirical studies deal with anthroposophy and science, and the question of the relationship between anthroposophy and Waldorf pedagogy (Leber, 2016; Oberski, 2011; Randoll & Peters, 2015) and in the past two decades, scarcely any dissertations can be found on the topic, anywhere in the world (Lejon, 1997; Mansikka, 2007; Ramirez, 2006). Despite this, Waldorf pedagogy has become widespread around the world.

Significant elements of the anthroposophical spiritual science based on Steiner's epistemological groundings and elements of Waldorf pedagogy based on this science both have roots in earlier times[4], however, its phenomenological (in Rudolf Steiner's terminology symptomological) statements about the human being, nature, science, pedagogy, arts are original, and they are unfolding a human-scientific approach. An example of this is how it explains natural phenomena as moral, allegorical entities, as a kind of natural scientific hermeneutics (Steiner, 2013):

Well, the way in which people construct machines, for instance, varies greatly according to the nature of the machine in question; at present machines are still imperfect and primitive, but everything tends towards the gradual development of a kind of machine that depends on oscillations, in which oscillation, vibration,

[4] For example, illustrating the hierarchies of the beings can be detected before Greek philosophy, e.g. the different registers on the Uruk Vase, and later, in Plato's analogy of the divided line (VI/509d-511e.) This was then followed by the long and complete periods of Western thought reaching to the Middle Ages, such as Dionysius the Areopagite's Ecclesiastical Hierarchy, Raymundus Lullus's Theory of Elements (Lullus pictured the staircases in Liber de ascensum as lapis, flora, planta, brutu, homo, celum, angeli, Deus - his ladder of beings), further examples: Bouelles (1512), Bonnet (1745); Hermann (1783); Lamarc (1809); Darwin (1859); Haeckel (1874); Reid (1882); Sparks (1932); Lewis (1992); Blackmore and Troscianko (2003) (as cited in Lovejoy, 2009) followed. Some of these evolution theories (Darwin, Haeckel, Lewis) had humans at the top, others (Llull, Bouelles, Reid) place spiritual beings above humans (Bouelles has got nine hierarchical levels above humans starting from the angels and rising up to the seraphins). Systems Theory, which was born at the turn of the century in the middle of Europe (with Alfred Schütz a social phenomenologist and with Ludwig von Bertalanffy, the founder of the general systems theory, both living in Vienna), left the allegories of Ancient Times and the Middle Ages behind, exchanged ontological models for epistemological ones, more appropriate for the modern mind with Western scientific rhetoric, and structured the world hierarchically from static formations to plants, animals, humans, to society and to higher levels impossible to comprehend Boulding (1956). Although this taxonomy mentions nothing about the validity of Steiner's theories, it is unlikely that Rudolf Steiner, with a residency in Vienna, would not have known about the historical-cultural backgrounds. Numerous other examples could be taken from Rudolf Steiner's works as examples for this; the life hierarchical theory is just one - that existed before his time. For example, the three- and the fourfold nature correspond with three and four spheres in Origen of Alexandria's and John Cassian's biblical hermeneutics. The definitions and the methodological use of thinking, feeling and willing can be traced back to the ancient Greek philosophers, to Immanuel Kant and Johann Friedrich Herbart. Education being independent from the state, and the freedom to research and to teach were both first discussed by Wilhelm von Humboldt; harmonising the teaching material with the "cultural epochs" theory was first mentioned by Tuiskon Ziller.

and sequential motion produce the machine's effect. (…) That is the terrible law of oscillations sounding in unison that would be fulfilled if the alluring call of the cow so seduces the Orient that the East would then be able to wholly penetrate the unspiritual, purely mechanistic civilization of the West and Centre. It would then become possible to create on the earth a mechanistic system of the universe. Everything connected with the activities of the air, of the environment, and everything connected with the activities of the stars, would be exterminated from human civilization. What human beings experience, for instance, through the cycle of the year, what they experience through living together with the sprouting, budding life of spring, with the fading, dying life of autumn – all this would lose its significance for them. Human civilization would resound with the clattering and rattling of oscillating machines and with the echo of this clattering and rattling, which would stream down to earth from the cosmos as a reaction to this mechanization of earth. If you observe a part of what is active at the present time, you will say yourselves: A part of our present-day civilization is actually on the way to having this terrible element of decline and fall as its goal (Steiner, 2013, pp. 30-31).

On these grounds, technology using electricity poses dangers to cultural, and social development, and to the evolution of consciousness (Steiner, 2000), which is relevant in a pedagogical sense. It is of importance how Steiner views electricity and modern technology using electricity in a methodological relation to Goethe's phenomenological studies of humanity and nature (Okumoto, 2019, p. 84; Steiner, 1928). Since this approach has been present in Waldorf pedagogy and in Waldorf schools, backed up by developmental psychological and institutional educational perspectives.

2 Information and communication technology from the perspective of Waldorf pedagogy

2.1 A developmental psychological view

Rudolf Steiner stated that concepts and concept acquisition have a pictorial (spiritual) origin, where the concept (as an abstraction) is fading away, the picture is bearing "the powers of germination", whereas pure intellect leads to the different forms of ossification (Steiner, 1961). Based on his anthropology and on psychology, in his pedagogical lectures, Steiner says that the main point of the teaching-learning process is to transmit pictures, especially, and not to expand concept acquisition with abstract definitions (Steiner, 1996). The logic of educational process in Waldorf pedagogy (second line) differs basically from the rational model (first line):

(1) DEFINITION (scientific) » CONCEPT (learning) » MEANING (knowledge)
(2) MEANING (picture) » CONCEPT (learning) » DEFINITION (artistic)

Bearing this and the literature in mind, Waldorf pedagogy is not a model focusing on the experience of acquisition but on the experience of knowledge, ideally, the "scientific" and the "artistic" overlapping each other, not just formally but contextually as well, so it is not part of the didactics to generate positive, emotionally amplified self-serving experience. As seen in the model above, the emphasis in the didactics of Waldorf pedagogy is not on building a system of abstract concepts in the learner, primarily, because the purely intellectual model leaves certain dimensions of the individual, like the instinctive-regulatory ones, untouched. The pictorial-moral representation of the world supports the young child in healthy development and not the conceptual-scientific explanation, but as Waldorf pedagogy nourishes age-appropriate conceptual thinking, it cannot be considered a naturalistic pedagogical model. In summary, the basis of the educational process in Rudolf Steiner's pedagogy is the shift (improvement) in the direction of the real pictorial world depending on one's own inner and moral powers; and not encouragement to immerse oneself in the virtual image-world leading to materialisation and affecting the electrochemical processes of the nervous system. This results, partly, in educators telling stories learned by heart, pupils creating and using their own main lesson books, and completely omitting or reducing the use of digital tools.

2.2 Educational-pedagogical perspective[5]

The human being, says Rudolf Steiner, as a spiritual being, understands the phenomena of the world in that they place themselves (their attention) into the phenomena perceived by them and connect it with the already existing concepts of individuality in an imaginative way (Steiner, 1996, pp. 31-46).Understanding the world is possible through the signs (sensations) here as well, but from an anthroposophical point of view, the human being as a spiritual being is capable of comprehending the meaning to which the signs refer. Although:

1) computers can work with signs but not with meaning, the manipulation of data creates the impression that the computer understands what it is doing; consequently, the user, considering the machine as something surpassing their abilities in certain areas, takes it as their partner; the computer is capable of determining the rhythm of its user's life (Jin Jeong, Suh, & Gweon, 2020; Yamada, Moshier, & Otto, 2016);
2) the whole operation of the computer is comprehensible for its user through interfaces and peripheries. When using it, one can easily leave their inner-higher self for a practical, shallow realm where they spend their time continuously. People working on computers may feel that logical, clear steps have incomprehensible consequences, so soon one realises that to overcome these challenges one usually has to follow logically

[5] The above-mentioned approach and perspectives were present in the Waldorf Curriculum implemented in the second appendix of the 17/2004. (V.20.) OM decree, but they are not present in the currently effective law.

incomprehensible conditions or has to turn to hoaxes. If this practice is enforced in the long run, a person, especially a child, experiences several delusions about the problems of the world: a) every problem can be solved, one just needs to try hard, b) problems are built up from tiny particles and are illogical, c) solving one small challenge means one can cope with a difficult task at once, everything operates perfectly;

3) languages used by computers lack all the nuances and richness of a living language which has relevant and negative consequences in a pedagogical sense; these are instructions, commands aimed at one special task (e.g. processing data), resembling the language used in the military, where these commands are not contradicted and unsophisticated.

Rudolf Steiner states that the relationship between the human being and the world is moral and individual. These attributes are entirely anti-computer. In Waldorf pedagogy learning based on the use of Information Technology poses problems:

1) it makes gaining knowledge and experiences similar to mercantilism. The status of "the educator and the learner" or "the master and apprentice" becomes similar to that of "a user and a supplier", where the educator does not, or hardly influences the learner's personal development. Moreover, the kind of knowledge that cannot be transformed into information is lost (Lankshear, Peters, & Knobel, 2000, pp. 21-23);
2) due to the connection with the virtual world, the sense of reality becomes weaker, thinking becomes illusory and unrealistic, humans become more vulnerable, easily influenced in spite of the seemingly increasing freedom;
3) improving technology makes computers smaller in size, where the processes are carried out in a condensed space, greatly isolated from its environment, at high speed, but oppositional to the organic and slow development specific to humans and to nature, and to the world humans live in. Although it is similar to the possible characteristics of spiritual beings (e.g. speed, boundless, free creativity), humans can reach this realm by using an external tool they cannot control or comprehend, and which is rather problematic (Lorenzo & Trujillo, 2018);
4) a source of danger is that the feedback and assessment is impersonal, free from several dimensions of humanity, so the younger the child the less helpful it is (Klimov, 2012, p. 197).

3 Discussion

According to the anthroposophical anthropology in Waldorf pedagogy, and to the Steiner's theory of human developmental stages, a young child's basic quality is imitation; children around puberty live in their feelings, and adolescents develop the power of own judgement stemming from the urge to be separate. One of the most essential tasks of Waldorf educators is nourishing and following a child's developmental stages with age-appropriate teaching

materials. A young child identifies themselves with the teacher's will, children before and after puberty live in the teacher's inner pictures, and adolescents formulate their wakening judgements relying upon the understanding of their teacher. These all require personal encounters and living relationships between human beings. Digital tools demolish and extinguish the space filled with attention by their nature. Waldorf pedagogy examines a child's physical, emotional, social and intellectual development when introducing activities and topics related to modern technology. Thinking about media and educating media is preceded by considering personal developmental perspectives. When using modern technology, movement is typically reduced to the minimal and the eyes are fixed. This form of experience leads to a false stimulus and other negative effects such as hyper-sensitivity of the sensory organs, the danger of addiction, nature deficit disorder, weakening ability to control impulses and damaging reflexive thinking (Bailey, Bailenson, Obradović, & Aguiar, 2019; Hu, Johnson, Teo, & Wu, 2020). According to Waldorf pedagogy infants only need to explore and conquer their real environment with their sensory organs, through movement and free play. Children need to create a healthy image of the "I" and feel other people's needs in real life relationships to be able to tackle the ethical, cultural and social questions arising when using modern technology. In Waldorf pedagogy digital media is therefore only introduced during puberty (Hübner, 2015).

Accordingly, Hungarian Waldorf Steiner educational institutions either strictly limit or completely prohibit the use of digital tools in their pedagogical practice. Nevertheless, high school teachers without a Waldorf-teacher certificate, or progressive high school teachers with a Waldorf-teacher certification, have been exploring the possible use of ICT in the Waldorf classroom. The theoretical and empirical research of Waldorf pedagogy and ICT poses a continuous challenge in Waldorf teacher-training.

Conclusion

The findings show that the institutional use of information and communication technologies contradicts the basis, tasks and spirit of Waldorf pedagogy entirely. Rudolf Steiner often emphasised that the educator has to be standing in their time, in other words, their deeds cannot be alien to their present-day life and culture. According to research studies, one of the reasons for the rapid growth of Waldorf schools in the last 100 years is the flexibility of the pedagogy, according to research studies. If we look at the epistemology and anthroposophical anthropology of Waldorf pedagogy, we can see that the autonomy of a Waldorf teacher is not limitless, and so a continuous practical and theoretical task of the Waldorf movement and Waldorf teachers is to establish and uphold a coherence between the practices of every Waldorf institution and Waldorf pedagogy (Goldshmidt, 2017), rather than to transmit the doctrines of anthroposophy to the learners (Pearce, 2019). If Waldorf schools wish to define

themselves as a high-standard alternative to mainstream education, the weaknesses of management and conceptions pointed out by empirical studies (Randoll & Peters, 2015, pp. 37-39) must be corrected by enhancing professionalism. Aligning the principles and practices in Waldorf schools is fostered by teachers engaging in artistic and self-development activities. In this respect, it is worth pointing out that the personal or institutional use of information technology entirely contradicts the basis, tasks and spirit of Waldorf pedagogy, but this does not exclude thinking about it. On the contrary, it rather urges its exploration: a more and more crucial task for human beings is to embed technology into the world through the intellect.

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Depression, Anxiety, and Stress in University Students: Effects of Dysfunctional Attitudes, Self-Esteem, and Age

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Abstract:
Introduction: This study aimed to investigate the direct and indirect effects of dysfunctional attitudes (perfectionism and dependency) and age on depression, anxiety, and stress and the mediator role of self-esteem in these relationships in undergraduate university students.
Methods: This study was designed as a relational study to examine the relationships between dysfunctional attitudes, depression, anxiety, stress, self-esteem, and age using path analysis technique. The participants consisted of 407 undergraduate university students, 287 females and 120 males. The data were collected using the Depression, Anxiety, Stress Scale (DASS-21), the short form of the Dysfunctional Attitudes Scale (DAS-17), the Rosenberg Self-esteem Scale, and Demographic Information Form.
Results: The findings showed that perfectionism positively affected the participants' depression and stress levels; however, direct effect of the perfectionism on anxiety was not significant at the alpha level of .05. Dependency directly and positively affected their stress level; however, it did not have a significant effect on their depression and anxiety levels. Self-esteem and age directly and negatively affected their depression, anxiety, and stress levels. Perfectionism and dependency negatively affected their self-esteem. Finally, dependency positively affected their depression, anxiety, and stress levels through the mediation of self-esteem.
Discussion: The findings showed that the students with high self-esteem would stay away from depression, anxiety, and stress. University students, who want to be flawless in all tasks and to be approved by others, have difficulties in making positive judgments about their selves. When the perfectionist and dependent students face difficulties, they may react emotionally, physically or behavioraly, and may feel disappointed, unhappy, guilty or depressed. The students who lose self-esteem, self-confidence, and optimism due to not feeling perfect may be more depressive and stressful. Self-esteem was found to have a full mediator role in the relationship between dependency and both depression and

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anxiety. The beliefs about the necessity of approval by others for being happy indirectly lead to worries about experiencing bad events in the future and being sad, unhappy, and depressed. These beliefs increase the negative self-judgments and cause losing self-confidence and underestimating the abilities and success. When the university students lose their self-esteem due to being disapproved by others, they may feel guilty, unhappy, depressive, and anxious. Self-esteem had a partial mediator role in the relationship between dependency and stress. Considering that stress is a reaction occurring when an individual feels threatened, it might be thought that the university students, who have beliefs about dependency, feel more threatened. The students who are not approved by others lose their self-esteem, so they may experience more stress. Finally, the increase in age led to a decrease in depression, anxiety, and stress. In addition to the developmental difficulties, the difficulties about university life may cause younger university students to experience more depression, anxiety, and stress.

Limitations: The data were collected from the students enrolled in the same university in the South-Eastern Anatolia Region of Turkey. The gender distribution of the participants was not balanced. The participants of this study were selected using the convenience sampling method. This study was designed quantitatively.

Conclusion: The results revealed that low self-esteem and the presence of dysfunctional attitudes were important risk factors in terms of university students' mental health. In order to prevent depression, anxiety, and stress in university students, the university counseling centers may organize individual or group counseling practices. These counseling practices should aim to support the development of self-esteem. Besides, psycho-educational programs aiming to increase self-esteem should be conducted.

Key words: depression, anxiety, stress, dysfunctional attitudes, self-esteem.

Introduction

During the university years, which is an important step in the transition from adolescence to adulthood, students feel under intense pressure due to a great variety of factors such as economic difficulties, academic duties, interpersonal relations, and changing lifestyle (Zeng, Wang, Xie, Hu, & Reinhardt, 2019). While some students can cope with this pressure effectively, others may have emotional, social, or academic difficulties (Boyraz, Horne, Owens, & Armstrong, 2016). For this reason, many university students' mental health may be at risk.

The most common mental health problems seen in university students are depression, anxiety, and stress (Beiter et al., 2015). According to the studies conducted over the last decade, the prevalence of depression among university students ranges from 23.2% to 79%, the prevalence of anxiety from 17.1% to

86.3%, and the prevalence of stress from 20.2% to 72.9% (Bilican, Yapici, & Kutlu, 2016; Cam & Top, 2018; Ediz, Ozcakir, & Bilgel, 2017; Mahmoud, Staten, Hall, & Lennie, 2012; Ozen, Ercan, Irgil, & Sigirli, 2010; Saleh, Camart, & Romo, 2017; Salem, Allah, & Said, 2016; Savcı & Aysan, 2014; Zeng et al., 2019).

When depression, anxiety, and stress symptoms intensify and persist for a long time, they disrupt the functionality of university students in different areas of life; and they also prevent them from living a healthy, successful, productive, and happy life (Arslan & Örnek, 2018). For example, it is known that university students with depressive symptoms exhibit more smoking and alcohol use behaviors (Arslan, Ayranci, Unsal, & Arslantas, 2009) and are prone to suicide (Dvorak, Lamis, & Malone, 2013). It is emphasized that university students with high anxiety levels are also less satisfied with their lives (Mahmoud et al., 2012). Depression, anxiety, and stress negatively affect especially the academic life of university students. High depression, anxiety, and stress cause their academic performance to decrease (Owens, Stevenson, Hadwin, & Norgate, 2012; Salem et al., 2016). So much so that high depression can result in school absenteeism (Finning et al., 2019) and even school dropout (Boyraz et al., 2016).

Considering their prevalence rates and the negative results they cause, it is understood that depression, anxiety, and stress are mental problems that should be overemphasized in regard to university students. Young people who are university students today will shape the future of the countries by taking active roles in different fields such as education, health, engineering, economics, arts or politics. In other words, protecting the mental health of today's youth is critical for the future of the countries (Mehešová, 2017). In higher education, psychological counseling and guidance services should focus on preventing the occurrence of depression, anxiety, and stress in university students. In order to prepare effective preventive psychological counseling and guidance practices, it is necessary to determine the risk factors related to depression, anxiety, and stress. In line with this necessity, this study focuses on the factors that pose a risk of depression, anxiety, and stress in an attempt to lead the psychological counseling and guidance services in higher education.

One of the risk factors that leave university students vulnerable to depression, anxiety, and stress is the dysfunctional attitudes or distorted thinking, which cognitive therapists put emphasis on. According to cognitive therapists, what impairs individuals' mental health is the disorders in their mindset (İkiz, 2016). Dysfunctional attitudes refer to these disorders in the individual's mindset; in other words, they are unrealistic evaluations and beliefs about oneself, the world, and the future (Beck, 2001). The foundations of the individual's beliefs are laid in early childhood years. For example, while children who are supported and loved by their parents develop positive beliefs about themselves, such as "I am loved" or "I am sufficient"; those deprived of support and love may develop negative beliefs, such as "I am not worthy of love" or "I am insufficient.". These

developmental experiences in the early childhood years, together with the critical events and traumatic experiences exposed in later years, constitute a system of beliefs known as cognitive schemas (Sharf, 2014). Beliefs that do not reflect the truth and are rigid, extreme, and over-generalized lead to extreme emotions, prevent individuals from demonstrating their performance (Savaşır, Boyacıoğlu, & Kabakçı, 1996), and have an influence in all periods of their life (Sharf, 2014). Dysfunctional thinking patterns, such as arbitrary inference, selective abstraction, over-generalization, magnification, minimization, personalization, labeling, and polarization, which cause individuals to misinterpret events (Corey, 2005), are considered as the source of all psychological disorders (Beck, 2001).

Weissman and Beck (1978) address dysfunctional attitudes in two dimensions: perfectionism/focusing on performance and dependency. Perfectionism involves the beliefs that the individual should be the best in everything he/she does, and the concerns about the negative evaluations of other people about his/her performance. Dependency, on the other hand, refers to the beliefs that one should get the appreciation and approval of other people in order to be happy (de Graaf, Roelofs, & Huibers, 2009; Şahin & Batıgün, 2016). In this study, dysfunctional attitudes are discussed within the framework of this two-dimensional classification.

Since dysfunctional attitudes emerged through the cognitive behavioral therapy approach developed by Beck for the treatment of depression (Beck, Rush, Shaw, & Emery, 1979), they are mostly associated with depression, and it is emphasized that dysfunctional attitudes leave the person vulnerable to depression (Horiuchi, Aoki, Takagaki, & Shoji, 2017; Tehranchi, Neshatdoost, & Amiri, 2019). However, there are close relationships between depression, anxiety, and stress (Zeng et al., 2019). Therefore, it can be expected that dysfunctional attitudes are associated with anxiety and stress as well as depression. Indeed, some studies have revealed that being a perfectionist (Pirbaglou et al., 2013) and the need for being approved by others (Steers et al., 2016; Yang et al., 2014) increase anxiety and stress. The beliefs regarding the necessity of being the best in everything and always getting the approval of others can cause an individual to be constantly preoccupied with thoughts such as "What if I cannot achieve the best?" or "What if people don't like me?" and consequently to experience more anxiety and stress. In this context, having dysfunctional attitudes related to perfectionism and dependency may be an important risk factor for the emergence of depression, anxiety, and stress in university students.

Another factor that poses a risk to the mental health of university students is low self-esteem. Self-esteem, which is considered as a central element of daily life (Kernis, 2003), includes one's evaluations of self-concept and emotional reactions about one's own characteristics (Burger, 2006). While people with high self-esteem make positive evaluations about their characteristics, people

with low self-esteem evaluate their characteristics negatively. High self-esteem is associated with self-confidence; optimism; risk-taking; being open to new experiences; a clear, consistent, and determined sense of self; desire for success; and resistance to challenges. Low self-esteem, on the other hand, is associated with lack of self-confidence, underestimating one's own abilities, not accepting the success, avoiding new experiences and risks, difficulty in making decisions, and despair in case of failure (André & Lelord, 2002; Baumeister, 1993; Burger, 2006; Plummer, 2005). Additionally, it is emphasized that individuals with low self-esteem fail to cope with stress (Avşaroğlu & İdayeva, 2020).

It can be thought that young people with low self-esteem experience more anxiety and stress in fulfilling their responsibilities regarding university life as they are not self-confident, and they are more vulnerable to emergence of depression, anxiety, and stress because they cannot effectively cope with the difficulties they face. Previous studies have also revealed that as the individuals' self-esteem decreases, their depression (Bajaj, Robins, & Pande, 2016; Chai et al., 2020; Sowislo & Orth, 2013), anxiety (Bajaj et al., 2016; Sowislo & Orth, 2013), and stress levels (Saleh et al., 2017) increase. Considering the current findings in the literature, it was expected in the current study that the decrease in self-esteem would cause an increase in depression, anxiety, and stress.

Previous studies have clearly proven that dysfunctional attitudes and low self-esteem are important risk factors for depression, anxiety, and stress. Previous studies have also addressed direct relationships between variables. However, dysfunctional attitudes may have an indirect effect of increasing depression, anxiety, and stress by causing a decrease in self-esteem. There are some findings in the literature that the increase in the dysfunctional attitudes causes a decrease in self-esteem (Ashby & Rice, 2002; Yuchang, Cuicui, Junxiu, & Junyi, 2017). Therefore, a university student who believes in the necessity of being the best in everything and always being approved by others may start making negative self-evaluations when these requirements are not fulfilled. They may also become more prone to experience depression, anxiety, and stress, as they are involved in negative self-evaluations. When the bilateral relationships between variables revealed by the previous studies are evaluated together, it is possible that self-esteem has a mediating role in the relationship between dysfunctional attitudes and depression, anxiety, and stress. For this reason, this study also examines the mediating effect of self-esteem, unlike the previous studies that examined the bilateral relationships between variables.

Age may be another factor that poses a risk of depression, anxiety, and stress in university students. Since they still have the developmental characteristics of adolescence and have less life experience, it can be thought that younger university students have more difficulties overcoming problems and coping with difficulties. Thus, being young can pose a risk of depression, anxiety, and stress. As a matter of fact, some previous studies have shown that younger university students experience more depression, anxiety, and stress (Mahmood et al.,

2012). Nevertheless, there are also findings indicating that being young is protective against depression, anxiety, and stress (Salam et al., 2016). Due to the inconsistencies between research findings, more research should be conducted in order to identify the effect of age. To that end, the effect of age on depression, anxiety, and stress is examined in the study.

In the light of the above information, the aim of this study is to examine the direct relationships between dysfunctional attitudes (perfectionism and dependency) and depression, anxiety, and stress, and the mediating role of self-esteem in these relationships. It is thought that determining the mediating role of self-esteem will help to better understand depression, anxiety, and stress in university students and shed light on preventive studies. Within the scope of the study, direct effect of age on the university students' symptoms of depression, anxiety, and stress symptoms is also tested. Since the previous findings related to the effect of age are not consistent with each other, the result to be obtained will contribute to a better understanding of the subject. In this direction, this study seeks answers to the following research questions:

1. What are the magnitude and direction of the effects of perfectionism on depression, anxiety, and stress?
2. What are the magnitude and direction of the effects of dependency on depression, anxiety, and stress?
3. What are the magnitude and direction of the effects of age on depression, anxiety, and stress?
4. What is the mediating effect of self-esteem in the relationships between perfectionism and dependency, and depression, anxiety, and stress?

1 Method

1.1 Study design

This relational study aims to examine the relationships between dysfunctional attitudes, depression, anxiety, stress, self-esteem, and age using path analysis technique.

1.2 Participants

The participants of the study consisted of 407 undergraduates, 70.5% (n=287) females and 29.5% (n=120) males, selected using the convenience sampling method, who were studying at the faculty of education, faculty of science and letters, faculty of theology and school of physical education and sports in a state university in the Southeastern Anatolia Region of Turkey in the academic year 2019-2020. The participants' ages ranged from 18 to 48 years (χ age=21.45, SDage=2.76). 21.4% (n=87) of the participants were freshmen, 34.6% (n=141) were sophomores, 22.4% (n=91) were juniors, and 21.6% (n=88) were seniors. 20.3% (n=83) of them defined the economic status of their family as low, 76.9% (n=313) as medium, and 2.7% (n=11) as high.

1.3 Data collection tools

1.3.1 Demographic Information Form

Data about the participants' age, gender, class level, the faculty they study at, and perceptions regarding the economic situation of their families were collected using a demographic information form created by the researchers.

1.3.2 Depression Anxiety Stress Scale-21 (DASS-21)

Original DASS was developed by Lovibond and Lovibond (1995) as a 42-item, 4-point Likert type scale (0 = Not suitable for me at all, 3 = Completely suitable for me) to evaluate three elements of negative mood (depression, anxiety, stress). Antony, Bieling, Cox, Enns, and Swinson (1998) found that the 21-item short form of DASS was also a valid and reliable measurement tool. In the adaptation study carried out by Yıldırım, Boysan, and Kefeli (2018), it was determined that the Turkish form preserved its original three-factor structure (S-B $\chi 2$=379.787, df=186, p<.001, RMSEA=.058, CFI=.929, TLI=.920, SRMR=.044) and the Cronbach's alpha internal consistency coefficients of DASS-21 were found as .89 for the sub-dimension “depression”, .87 for the sub-dimension “anxiety”, and .90 for the sub-dimension “stress”. Within the scope of this study, Cronbach's alpha internal consistency coefficients were calculated as .85, .82, and .83, respectively. There is no total score for the overall scale, and the total scores for each sub-dimension are calculated separately. The scores for each sub-dimension are in the range of 0-21. The higher the score, the more the individual experiences depression, anxiety, or stress.

1.3.3 Dysfunctional Attitudes Scale Short Form (DAS-17)

Original DAS was developed by Weissman and Beck (1978) as a 40-item, 7-point Likert type scale (1-I totally disagree, 7-I totally agree) in two separate forms, i.e. A and B, in order to evaluate the dysfunctional attitudes associated with depression. De Graaf, Roelofs, and Huibers (2009) selected 17 items from the form A and created the 17-item short form of DAS. The scale consists of two sub-dimensions: perfectionism/focusing on performance (11 items) and dependency (6 items). The results of the explanatory and confirmatory factor analysis, which was conducted within the scope of the Turkish adaptation study carried out by Şahin and Batıgün (2016), revealed that the two-dimensional structure of the scale was preserved in the Turkish version ($\chi 2$=352.60 (p<.001), $\chi 2$/df=3.14, RMSEA=.06, GFI=.92, AGFI=.89, SRMR=.06, ECVI=.92). In the adaptation study, Cronbach's alpha internal consistency coefficients of the Turkish form of the DAS-17 were found as .77 for the sub-dimension “perfectionism” and .74 for the sub-dimension “dependency”. In the present study, the Cronbach’s alpha internal consistency coefficients were calculated as .83 for perfectionism and .77 for dependency. The scores for the sub-dimension “perfectionism” range from 11 to 77, and the scores for the sub-dimension

"dependency" vary between 6 and 42. The higher the scores, the higher the perfectionism or dependency.

1.3.4 Rosenberg Self-Esteem Scale (RSES)

Originally developed by Rosenberg (1963), RSES consists of 63 items and 12 sub-dimensions. The first dimension evaluating self-esteem is a 4-point Likert type scale (1 - So wrong, 4 - So true) and consists of 10 items. The scale was adapted to Turkish by Çuhadaroğlu (1986). In the adaptation study, the test-retest reliability coefficient of the scale was found as .75. In the present study, the Cronbach's alpha internal consistency coefficient of the scale was calculated as .84. The scores for the scale vary between 10 and 40, and the higher the score, the higher the self-esteem.

1.4 Data collection and analysis

Before the data was collected, necessary application permissions were obtained from the Ethics Committee of the university, where the data would be collected (Document number of the ethics committee approval: 20.03.2020-E.184-E.1962). Afterwards, the scale forms were transferred to the online environment via Google Forms application, and the online questionnaire link was shared with the students by the researcher via WhatsApp application in the classroom environment. Before starting to fill out the questionnaire, the researcher verbally informed the students about the purpose of the study and explained that participation in the study was completely voluntary, and they could refuse to fill out the questionnaire during the data collection phase. It took approximately 20 minutes to complete the questionnaires.

After reviewing the current literature, the proposed model shown in Figure 1 was established. According to this model, perfectionism, dependency, and age were the exogenous variables; depression, anxiety, and stress were the endogenous variables; and self-esteem was the mediating variable. The study hypothesized that there were direct effects of perfectionism and dependency on depression, anxiety, and stress, and indirect effects through self-esteem, and direct effects of age on depression, anxiety, and stress. Hypotheses were tested via path analysis.

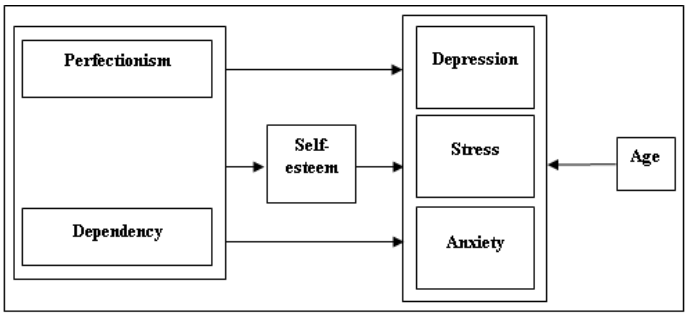

Figure 1. Hypothesized path model.

In the study, total scores for depression, anxiety, stress, perfectionism, dependency, and self-esteem were calculated, and the scores of all the variables together with age were used in the analysis as a continuous variable. Mplus 7 (Muthen & Muthen, 1998-2012) statistical program was used to analyze the data. Although the hypothesized model perfectly fit the data, as some effects were not statistically significant (greater than .05), this model was reviewed, and the selected model shown in Figure 2 was obtained. Correlation values between variables, means, and standard deviations of the total scores of the variables are given in Table 1. Bootstrap method was used with 1000 trials in path analysis, and 90% confidence intervals for direct, indirect, and total effects are given in Table 2.

Table 1

Correlations among variables, means and standard deviations

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1.Age	--						
2.Perfectionsim	-.05	--					
3.Dependency	-.11*	-.48*	--				
4.Self-esteem	-.00	-.26*	-.35*	--			
5.Depression	-.14*	.27*	.21*	-.36*	--		
6.Anxiety	-.20*	.15*	.19*	-.26*	.70*	--	
7.Stress	-.17*	.25*	.25*	-.28*	.77*	.74*	--
Mean	21.45	27.74	20.62	30.61	8.31	6.83	9.00
Standard Deviation	2.76	12.39	7.87	4.94	4.62	4.17	4.28

*****p<.05

2 Findings

2.1 Findings related to model-data fit

Model-data fit statistics for the hypothesized model given in Figure 1 were found as $\chi 2/df$ =0.32/1, p=.57, CFI=1.00, TLI=1.00, SRMR=.00. According to these findings, the hypothesized model perfectly fit the data (Hooper, Coughla, & Mullen, 2008; Kline 2005). Some effects (paths) in this model were excluded from the model because they were not statistically significant. Model fit statistics for the selected path analysis given in Figure 2 were found as $\chi 2/df$=5.11/4, p=.27, CFI=.99, TLI=.99, SRMR=.02. These values indicate that the selected path analysis model fit the data very well. The variance ratios explained by depression, anxiety, stress, and self-esteem were statistically significant at the level of .05 and found as .17, .11, .12, and .14, respectively.

2.2 Findings related to direct, indirect, and total effects

Perfectionism. Perfectionism was found to have statistically significant total effects on self-esteem (-.05), depression (.06), and stress (.04). The whole .05

effect on self-esteem was a direct effect. .04 of the total effect of .06 on depression was a direct effect and .02 was an indirect effect. However, only the direct effect was statistically significant, but the indirect effect was not. .03 of the total effect of .04 on stress was a direct effect and .01 was an indirect effect. However, only the direct effect was statistically significant, but the indirect effect was not. Perfectionism had no direct effect on anxiety, but had an indirect effect through self-esteem; however, this was not a significant effect. According to the findings, the effects of perfectionism on depression, self-esteem, and stress were quite close to each other and small.

Dependency. Dependency was found to have statistically significant total effects on self-esteem (-.18), depression (.05), anxiety (.04), and stress (.07). The whole effect of -.18 on self-esteem was a direct effect. The total effects of .05 on depression and .04 on anxiety were all indirect effects. Indirect effects were through self-esteem. Therefore, self-esteem was found to fully mediate the effect between dependency, and depression and anxiety. .04 of the .07 effect on stress was a direct effect and .03 was an indirect effect. Both the direct and indirect effects were significant, and the indirect effect was through self-esteem. Accordingly, dependency had a greater effect on self-esteem than perfectionism, and self-esteem mediated between dependency, and depression, anxiety, and stress.

Age. Based on the proposed model, age was found to have statistically significant total effects on depression (-.22), anxiety (-.29), and stress (-.22). All the effects were direct, and age did not have any indirect effect on these three endogenous variables. The effect of age on anxiety was greater than its effect on depression and stress. In addition, it was observed that as the age increased, the students' depression, anxiety, and stress levels decreased.

Self-esteem. Based on the model, self-esteem was found to have statistically significant total effects on depression (-.30), anxiety (-.21), and stress (-.20). All the effects were direct, and self-esteem did not have any indirect effect on these three endogenous variables. The effect of self-esteem on depression was greater than its effect on anxiety and stress. In addition, it was observed that as the self-esteem increased, the students' depression, anxiety, and stress levels decreased.

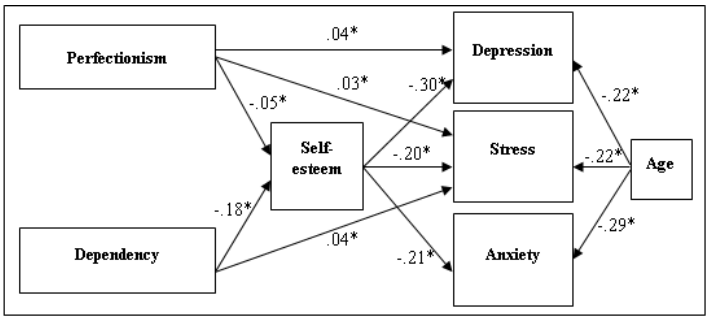

Figure 2. Selected path model

Table 2

The sizes and 90% confidence intervals of total, direct, and indirect effects of variables in the selected path model

	Endogenous Variables			
Exogenous Variables	*Self-esteem*	*Depression*	*Anxiety*	*Stress*
Perfectionism	-.05*[-.09,-.01]	.04*[.02, .06]	--	.03*[.02, .06]
	--	*.02* [.00, .03]	*.01* [.00, .02]	*.01* [.00, .03]
	-.05*[-.09,-.01]	**.06***[.03, .08]	**.01** [.00, .02]	**.04***[.03, .08]
Dependency	-.18*[-.24,-.12]	--	--	.04*[.02, .06]
	--	*.05**[.03, .08]	*.04**[.02, .06]	*.03**[.00, .03]
	-.18*[-.24,-.12]	**.05***[.03, .08]	**.04***[.02, .06]	**.07***[.03, .08]
Age	--	-.22*[-.36,-.12]	-.29*[-.40,-.20]	-.22*[-.36,-.12]
	--	--	--	--
	--	**-.22***[-.36,-.12]	**-.29***[-.36,-.20]	**-.22***[-.36,-.12]
Self-esteem	--	-.30*[-.38,-.23]	-.21*[-.28,-.14]	-.20*[-.27,-.12]
	--	--	--	--
	--	**-.30***[-.38,-.23]	**-.21***[-.28,-.14]	**-.20***[-.27,-.12]

Note. Direct effects in regular text, indirect effects in italics, and total effects in bold. The symbol – means the effect is not in the model; *p<.05; all effects are unstandardized effects.

3 Discussion

The findings of the study revealed that dysfunctional attitudes related to perfectionism and dependency, low self-esteem, and being young were important risk factors for depression, anxiety, and stress, which are common in university students (Beiter et al., 2015). Accordingly, it is important that university psychological counseling and guidance centers organize studies aiming to protect the mental health of the students, who are younger and have dysfunctional attitudes and low self-esteem.

The first finding is that the increase in self-esteem decreased the university students' symptoms of depression, anxiety, and stress. This finding is in parallel with the findings of previous studies, which revealed that self-esteem was negatively associated with depression (Bajaj et al., 2016; Chai et al., 2020; Sowislo & Orth, 2013), anxiety (Bajaj et al., 2016; Sowislo & Orth, 2013), and stress (Saleh et al., 2017). Accordingly, it can be asserted that having positive evaluations regarding own personality traits (Burger, 2006) is an important protective factor for the university students to keep themselves away from mental problems. It is emphasized that an individual with high self-esteem feels more confident, can have an optimistic view about events, likes new experiences, does not hesitate to take risks, and prefers to resist instead of giving up immediately in the face of difficulties or failures (André & Lelord, 2002; Baumeister, 1993; Burger, 2006; Plummer, 2005). Therefore, it can be thought

that a university student with high self-esteem is more confident, more optimistic, makes an attempt to solve problems, and in case of failure, attempts to apply new solutions instead of giving up and giving into negative feelings about dealing with financial difficulties, concerns for the future, academic pressures, problems in emotional relations, in friendships or family problems that they face during university years. In other words, high self-esteem can help university students cope with difficulties more effectively; thus, it contributes to keeping away from negative emotions such as depression, anxiety, and stress. In the study, it was also found that the effect of self-esteem on depression was greater than its effect on anxiety and stress. Accordingly, it can be asserted that low self-esteem is more of an important risk factor for the emergence of depression rather than anxiety and stress.

The second finding is that the university students' dysfunctional attitudes related to perfectionist and dependency affected their self-esteem directly in a negative way. In other words, their beliefs that they should be perfect in everything they do, and it is not possible to be happy without the approval of others (de Graaf et al., 2009; Şahin & Batıgün, 2016) made it difficult for the university students to respect themselves and make positive self-evaluations. This result supports the previous findings (Ashby & Rice, 2002; Yuchang et al., 2017) showing that an increase in dysfunctional attitudes leads to a decrease in self-esteem. Accordingly, beliefs about perfectionism and gaining the approval of others are important risk factors for low self-esteem in university students. It can be asserted that as their beliefs about being perfect and gaining the approval of others increase, the behaviors indicating low self-esteem are more likely to arise in university students, such as lack of self-confidence, underestimating own abilities, not accepting own successes, abstaining from new experiences, avoiding taking risks, difficulty in making decisions, and despair in case of failure (André & Lelord, 2002; Baumeister, 1993; Burger, 2006; Plummer, 2005). In the current study, it was also found that the effect of dependency on self-esteem was greater than that of perfectionism. Accordingly, it can be thought that university students' self-evaluations are mostly shaped within the frame of the respect, value, and importance attached by others. In the increase of the university students' self-esteem, it is important that they feel admired and appreciated by others rather than achieve perfection in everything they do. This may be an indication that their personalities are still not fully formed, and they still have the characteristics of adolescence.

The third finding is that the university students' perfectionist attitudes had a direct effect on the increase in their depression and stress levels. This result, which is in line with the findings of the previous studies (Kaya et al., 2019), shows that the university students' beliefs that they should be the best in everything they do and their concerns regarding the negative evaluations of other people about their performance (de Graaf et al., 2009; Şahin & Batıgün, 2016) are among the main risk factors for depression and stress symptoms. In addition,

the findings showed that the direct effect of perfectionist attitudes on anxiety was not significant. The university students, who believe they must be perfect, may encounter a great variety of difficulties that prevent them from achieving perfection or make it difficult for them. These difficulties can lead to emotional, physical, and behavioral stress reactions. University students, who cannot achieve the desired perfection for various reasons, may get disappointed and show depressive symptoms such as sadness, unhappiness, guilt, and pessimism because their expectations are not satisfied. However, university students' expectations of being the best do not have an impact on their concerns about the bad things possible to occur in the future.

The fourth finding is that although dependency did not have a direct effect on depression and anxiety, it affected them indirectly through self-esteem in a positive way. The effect of dependency on depression and anxiety was indirect and totally through self-esteem. In other words, self-esteem played a full mediating role in the relationship between dependency, and depression and anxiety. Accordingly, the beliefs regarding that it is a necessity to be admired and appreciated by others in order to be happy (de Graaf et al., 2009; Şahin & Batıgün, 2016) do not directly cause the university students to be concerned about the bad events that might occur in the future or to show depressive symptoms such as long-term sadness, unhappiness, guilt, pessimism, despair, and lack of energy. However, it can be asserted that these beliefs increase the tendency to make negative self-evaluation, lose self-confidence, underestimate own abilities and achievements, and have difficulty in making decisions (André & Lelord, 2002; Baumeister, 1993; Burger, 2006; Plummer, 2005). University students, who lose their self-esteem as they do not receive the admiration and appreciation they expect from others, may feel guilty, be pessimistic and unhappy on the one hand, and be worried about the future bad events on the other.

The fifth finding is that dependency positively affected stress directly as well as indirectly through self-esteem. Thus, self-esteem plays a partial mediating role in the relationship between dependency and stress. Considering that stress is a reaction that occurs when the individual feels under threat, it can be thought that university students who believe that they need to get the appreciation and approval of the other people for being happy (de Graaf et al., 2009; Şahin ve Batıgün, 2016) feel more threatened. The fact that these students' self-evaluation, i.e. their self-esteem, depends on the appreciations and approvals of others also exerts an influence on the stress they experience. It is possible that the university students who feel disapproved by others get more stressed, as their self-esteem decreases. As can be seen, while perfectionism has a direct effect on depression, dependency affects depression through self-esteem. This result supports the findings of Horiuchi et al. (2017) that perfectionist attitudes are more effective on depression compared to dependency attitudes.

The final finding is that the students' depression, anxiety, and stress levels decreased as their age increased. This result is consistent with the findings of previous studies (Mahmood et al., 2012) showing that younger university students have more depression, anxiety, and stress symptoms than the older ones. The reason why younger university students show more depression, anxiety, and stress symptoms may be associated with developmental characteristics. It can be thought that at the ages of 18-19, which can be defined as late adolescence, university students cannot fully adapt themselves to the rapid changes occurring in their adolescence and begin higher education with intense and complex emotions. Their developmentally complex and uncertain environment may also make it difficult for them to adapt themselves to the university life and fulfill its requirements. Younger university students who have difficulties regarding university life as well as developmental difficulties may show more intense symptoms of depression, anxiety, and stress. It can be thought that as the university students get older and step from adolescence to adulthood, they begin to move away from these negative moods.

This study has some limitations. First, the data were collected from the students enrolled in the same university in the Southeastern Anatolia Region of Turkey. In the future, renewal of the study with the participation of students from different regions and different cities may help to reach more general results. Second, when the distribution of the students participating in the study is examined by gender, it can be seen that the number of female (n=287) was more than twice the number of male (n=120). Future studies can be carried out on a more gender-balanced study group. Third, the information on the demographic characteristics of the students was limited in this study. However, factors such as having a job, housing conditions, and studying at a second university may also have an effect on the university students' level of depression, anxiety, and stress. For example, depression, anxiety, and stress symptoms of the students who live with their family may differ from those of the university students who are away from their family. Or the students, who have to study at a second university after completing a bachelor's program because they cannot begin a career, may have a higher level of depression, anxiety, and stress. Future studies can be organized by paying attention to the factors such as having a job, housing conditions, and studying at a second university. Fourth, the participants of this study were selected using the convenience sampling method. In the future, studies based on random sampling method may be carried out. Fifth, this study was designed quantitatively. Future studies to be designed using a mixed method can contribute to a better understanding of the subject.

Conclusion

It is understood from the results of the study that the presence of low self-esteem and dysfunctional attitudes related to perfectionism and dependency are important risk factors for the mental health of university students. On this basis,

in order to prevent the emergence of depression, anxiety, and stress symptoms in university students, it is recommended to conduct screening studies at universities to identify the students with dysfunctional attitudes, and to apply psycho-educational programs to help the students who are found to have beliefs regarding perfectionism and dependency develop healthier beliefs. Besides, individual and group counseling applications can be beneficial for the students with low self-esteem. Focusing on dysfunctional attitudes in studies towards improving self-esteem will produce effective results. Since it was determined that self-esteem had a mediating role in the effect of dependency on depression, anxiety, and stress, it is important to improve self-esteem of the students who especially have dysfunctional attitudes related to dependency. As the foundation of dysfunctional attitudes lies in early childhood experiences, informing parents about healthy child rearing attitudes will contribute to children's being mentally healthier adults. There may be other psychological variables that trigger the emergence of depression, anxiety, and stress. Expanding the scope of this study in the future in a way to include other psychological variables affecting depression, anxiety, and stress may make a significant contribution to the literature. For example, traumatic experiences can also have an impact on depression, anxiety, and stress symptoms. In the future, researchers can examine whether traumatic experiences have a mediating role in the effects of dysfunctional attitudes and self-esteem on depression, anxiety, and stress.

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Organizational Justice, Perceived Stress and Leader Support as Predictors of Teachers' Job Satisfaction

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Abstract:
Introduction: Teachers' job satisfaction which has a positive effect on the quality of education, students, teachers and schools is significant for the successful functioning of schools. On the other hand, the increase in the level of dissatisfaction causes disciplinary problems, inefficiency, job dissatisfaction, alienation from the job, or leaving the job. Therefore, research on teachers' job satisfaction can help to understand the general and specific aspects of teachers' job satisfaction, which in turn this information can provide a scientific basis for solving problems.
Methods: The study uses quantitative research methodologies based on a correlational research. The research data obtained the convenience sampling method from 396 teachers who work for public schools in the province of Denizli in Turkey. Multiple regression was used for analysis.
Results: The results of the study showed that organizational justice, perceived stress and leadership support are all significant predictors of teachers' job satisfaction. The relative importance order of the specified variables in predicting teachers' job satisfaction is organizational justice, perceived stress and leader support, respectively. Predictor variables account for approximately 50.4% of the total variance in teachers' job satisfaction.
Discussion: Within the scope of the research, the relationships determined between job satisfaction, organizational justice, perceived stress and leader support are consistent with the results of the research conducted on teachers and other professional groups in the literature. Implications of the study results were discussed in detail.
Limitations: In addition to its contributions to the literature, the research also has some limitations. Basically, correlational research results can be useful to reveal the existing relationships between variables, but it should be emphasized that these relationships are not causal ones. Furthermore, the use of convenience sampling method among non-random sampling

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methods can be considered as another limitation. However, the consistency of the relationships determined between the variables of the study with the existing literature indicates that the bias due to this limitation is relatively low.

Conclusion: The results of the study indicated that the order of relative importance in educational policies and practices that will take teachers' job satisfaction into account should be structured as organizational justice, perceived stress and leader support. However, it is thought that holistic approaches that include all variables can be more effective, since variables of organizational justice, perceived stress and leader support are significantly associated with teachers' job satisfaction.

Key words: teachers' job satisfaction, organizational justice, perceived stress, leadership support.

Introduction

Employee job satisfaction has been an intensive study area both for researchers and practitioners since the classic work of Hoppock (1935) was published. Job satisfaction is defined as the degree that employees like their jobs and different aspects of their jobs (Spector, 1997) or a pleasurable emotional state arising from evaluating their work (Locke, 1976). The concept of teachers' job satisfaction is defined as teachers' general attitudes and opinions towards their working conditions and professions (Hongying, 2007). The concepts of job satisfaction, organization justice, perceived stress and leader support are introduced below respectively.

1 Theoretical background

1.1 Job satisfaction

Job satisfaction is the result of employees' perception of how well their job delivers what is considered essential by them, and research showed that job satisfaction affects teachers' job enthusiasm (Weiqi, 2007). On an individual level, job satisfaction affects job enthusiasm and mental health of teachers whereas in terms of school administration teachers' job satisfaction is seen as a factor that affects the teaching, school quality and efficiency of school leadership (Hongying, 2007). Since job satisfaction is an attitudinal and dynamic concept, it can vary in the process due to its nature. In other words, since satisfaction level is an attitude formed by the employee's own perception, the effects of various factors may differ due to individual orientations (Toker, 2006). In literature, the factors that focus on the content of the profession (e.g., positive relationships with colleagues and students, diversity in the profession, etc.), generally lead to an increase in experienced job satisfaction. However, according to the extent that they have an effect, employment conditions (e.g., income,

working hours, administrative burden, too much work, etc.) generally lead to a decrease in job satisfaction (Van Ham, Verhoeven, Groenier, Groothoff, & De Haan, 2006). In this context, it is stated that teachers are generally delighted with internal factors such as interpersonal relations, self-fulfillment, social recognition and professional input, and not satisfied with other factors such as wage income, promotions, physical environments, student quality, educational social environment and job stress (Hongying, 2007). In addition to this, organizational factors; leader attitudes and behaviors (Karaköse & Kocabaş, 2006), wage (Filiz, 2014; Göktaş, 2007), working conditions and promotion opportunities (Ayan, Kocacık, & Karakuş, 2009; Liu & Ramsey, 2008; Shen, Leslie, Spybrook, & Ma, 2012; Taşdan & Tiryaki, 2008), group factors; manager and colleague relations (Koruklu, Feyzioğlu, Özenoğlu-Kiremit, & Aladağ, 2013; Tunacan & Çetin, 2009), organizational and group factors (Özkalp & Kırel, 1996) are significantly associated with job satisfaction.

1.2 Organizational justice

Organization justice is a concept that is typically used to define the role of justice in workplaces. This concept is primarily related to whether employees have a fair treatment at work and the ways how these findings can affect the other work-related variables (Moorman, 1991). While organizational justice was initially addressed in terms of the distributive justice dimension (origins from Adams' work; 1965) and procedural justice dimension (Thibaut & Walker, 1975) in the literature (e.g., Folger & Greenberg, 1985; Moorman, 1991), then the interactional justice dimension (Bies & Moag, 1986) was introduced. The idea which states interactional justice consists of interpersonal and informational justice sub-dimensions started to be accepted (e.g., Cropanzano, Bowen, & Gilliland, 2007; Greenberg, 1990, 1993). Distributive justice is about the perception of the most significant results (e.g., salary, promotion, shift, assignments and workplace discipline, etc.) by employees as fair in organizations and whether all employees are treated in the same way (Cohen-Charash & Spector, 2001; Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Cropanzano et al., 2007). Procedural justice refers to the perceptions of employees regarding the fairness and accuracy of the procedures and policies used to achieve distributive justice (Colquitt et al., 2001; Greenberg, 1990). Interactional justice in the simplest sense refers to how one person treats another (Cropanzano et al., 2007). Interpersonal fairness generally refers to the degree at which employees are treated with courtesy, dignity and respect in the implementation of procedures or determination of results. Informational justice focuses on explanations given to people who pass on information about why procedures are used in a particular way or why results are being distributed in a particular way (Colquitt et al., 2001). Organizational justice is positively related to job satisfaction (Al-Zu'bi, 2010; DeConinck & Stilwell, 2004; Kılıç, 2016; Eker, 2006; Özen-Kutanis & Mesci, 2010; Netemeyer, Boles, McKee, &

McMurrian, 1997; Nojani, Arjmandnia, Afrooz, & Rajabi, 2012; Yıldırım, 2007) and directly affects job satisfaction (Najafi, Noruzy, Azar, Nazari-Shirkouhi, & Dalv, 2011). Besides, the communication and treatment of managers in the implementation of organizational justice also affect employees' perceptions of stress (Swandarujati, Nurfitri, & Anggraeni, 2019). Moreover, organizational justice is associated with increased employee performance (Cohen-Charash & Spector, 2001), job satisfaction and organizational commitment (Bağcı, 2013; Candan, 2014) and a decrease in turnover tendencies (Demircan-Çakar & Yıldız, 2009). In addition to this, there is a positive and significant relationship between teachers' perceptions of organizational justice and job satisfaction (Altahayneh, Khasawneh, & Abedalhafiz, 2014; Dundar & Tabancali, 2012; Nojani et al., 2012; Zainalipour, Fini, & Mirkamali, 2010).

1.3 Perceived stress

The amount of pleasure or job satisfaction any person gets while doing a job is affected by several factors (Cooper, Rout, & Faragher, 1989). One of the factors affecting the job satisfaction of employees is stress (Bolin, 2007; Cooper et al., 1989; Hongying, 2007; Şanlı, 2017; Weiqi, 2007; Toker, 2006; Yüksel, 2003). In general, stress is an unpleasant emotional and physiological condition that is caused by uncertainty or experiences beyond the employee's control and is considered harmful by employees (Swandarujati et al., 2019). Stress, which is a common problem today, has adverse effects on physiological and mental health (Lee, Joo, & Choi, 2013). On the other hand, stress has a positive aspect (Aydın, 2004; Onay-Özkaya, Yakın, & Ekinci, 2008). The concept stated as positive stress is a constructive value that increases the individual's motivation. For the teaching profession which is considered to be one of today's stressful professions, moderate stress helps to increase performance, while experiencing a high-level of stress causes harmful effects (Balaban, 2000). The stress encountered in the teaching profession has been conceptualized as teacher stress in the literature. Teacher stress can be defined as experiencing unpleasant negative emotions such as anger, anxiety, tension, disappointment, or depression that originated from some part of the teachers' work (Kyriacou, 2001). Teachers' stresses are attributable to negative school climate, inappropriate student behavior, maintaining discipline, time pressure and workload, coping with change, being evaluated by others, relationships with colleagues, self-esteem and status, role conflict and uncertainty, inadequate classroom resources, school management, poor working conditions and deficiencies in teachers' recognition of their profession (Boyle, Borg, Falzon, & Baglioni, 1995; Kremer-Hayon & Goldstein, 1990; Kyriacou, 2001).

1.4 Leader support

Leadership in education is crucial as it has the potential to affect both learning outcomes and relationships between teacher and student. This contributes to the

creation and maintenance of an effective learning climate, the development and improvement of teamwork during educational process (Daučianskaitė & Žydžiūnaitė, 2020). An essential indicator of leadership in education can be a leader support perceived by teachers in schools. Teachers develop some opinions on the leader's efforts for the welfare of the school. As suggested by Eisenberger, Stinglhamber, Vandenberghe, Sucharski and Rhoades (2002), teachers as employees perceive the leader's positive and negative behaviors towards them as an indicator of organizational support. In this context, leader support can be defined as the degree of support and interest that a person perceives from their immediate supervisor (Netemeyer et al., 1997). In the educational leadership literature, there are leadership types created with different perspectives. It can be said that the common point of these concepts, which are dealt with theoretically and empirically, is to increase student learning, to create a positive school climate based on open and honesty for student, teacher and leader learning and to include teachers in decision-making processes (Kılınç, 2016; Sancar, 2009). Leadership behaviors of school principals are significantly correlated with teachers' job satisfaction (Bogler, 2001; Hulpia et al., 2009; Sancar, 2009). A leader's support of employees is related to job satisfaction (Asgari, Mezginejad, & Taherpour, 2020; Kale, 2015; Tsai, 2011) and has a determinant feature in increasing the employee's job satisfaction within the framework of the work process (Fernandez, 2008; Karadağ, Başaran, & Korkmaz, 2009; Tanrıverdi & Paşaoğlu, 2014; Tengilimoğlu & Yiğit, 2005) and shows a strong relationship with leadership styles and organizational justice concepts (Çoğaltay, Karadağ, & Bektas, 2014). In line with this, it is stated that such factors as giving opportunity teachers to explain their work to their colleagues, encourage them for quick and easy communication, praise teachers' work, empower teachers and include them in decision-making processes can increase teachers' job satisfaction (Lunenburg & Ornstein, 2000).

It is seen that teachers' job satisfaction which has a positive effect on the quality of education, students, teachers and schools is significant for the successful functioning of schools (Michaelowa & Wittmann, 2007). On the other hand, the increase in the level of dissatisfaction causes disciplinary problems, inefficiency, job dissatisfaction, alienation from the job, or leaving the job (Akıncı, 2002; Chen, 2010). Therefore, effective school principals pay attention to teachers' job satisfaction for the long-term efficiency (Güçlü, 2001).

Research on teachers' job satisfaction can help to understand the general and specific aspects of teachers' job satisfaction which in turn can provide a scientific basis for solving problems (Hongying, 2007). The existing literature reveals that the relationship between organizational justice, perceived stress, and leader support variables and job satisfaction is not evaluated together. In addition to revealing the relationships between the specified variables and determining the predicting levels of these variables on teachers' job satisfaction has the potential to contribute to the relevant literature. In this context, the

purpose of the present study is to determine the levels of organizational justice, stress and leader support variables in predicting teachers' job satisfaction. Thus, it is aimed to provide empirical evidence in light of the information obtained in this research for education policymakers, practitioners and researchers.

2 Method

2.1 Research design

This study was mainly designed as a correlational research. Correlational research, which can also be described as a descriptive research type, is used to clarify our understanding of essential phenomena by determining the relationship between two or more variables. If there is a sufficiently high relationship between these variables, the score of one variable can be estimated by using the scores of other variables. Therefore, it can be evaluated as a predictive type of correlational research in terms of the current research objective (Fraenkel, Wallen, & Hyun, 2011).

2.2 Participants

The population of the study consists of 14 135 teachers in Denizli, Turkey in the academic year of 2018-2019. The sample of the study consists of 396 teachers working in 31 different branches in 231 state schools. 58.6% of the participants are female (n=232) and 41.4% of the participants were male (n=164) in the sample. The working time of the participants varies between 1-44 years. Within the scope of the present study, a convenience sampling method was preferred among non-random sampling methods. In much educational research, it is difficult, sometimes impossible, to select a completely random sample. In this case, researchers can choose the appropriate sampling method. However, this preferred sampling method may be biased (Fraenkel et al., 2011). The sample size adequacy for a completely random sample in population of 20 000 people (with a 95% confidence interval) is 377 (Cohen, Manion, & Morrison, 2018). However, since a completely random sampling is not possible within the scope of the research, data collection tools were delivered to 23 different schools from 5 different districts in order to reduce the bias caused by the sampling method. In addition to this, efforts were made to reach as many participants as possible rather than the adequate sample size. Nevertheless, only 396 participants turned voluntarily back to data collection tools.

2.3 Data collection tools

Within the scope of the research, Minnessota Job Satisfaction Scale, Organizational Justice Scale, Perceived Stress Scale, Leader Support Scale and demographic information form prepared by the researchers were used as data collection tools.

Minnessota Job Satisfaction Scale. The scale developed by Weiss, Dawis, England, and Lofquist (1967) was adapted to Turkish language by Oran (1989). The scale consists of 20 items that can be graded in 5-point Likert type. Cronbach's Alpha (Cr α) reliability coefficient of the scale, in which internal satisfaction, external satisfaction and general satisfaction scores can be obtained, was reported as Cr α = .83. Yıldırım (1996) reported the test-retest reliability coefficient of the scale as .76 and the internal consistency coefficient as .90. Within the scope of the present study, the reliability coefficient of the scale was determined as Cr α = .96.

Organizational Justice Scale. The scale developed by Niehoff and Moorman (1993) was adapted to Turkish language by Yıldırım (2002). The scale consists of 20 items that can be graded in 5-point Likert type. The Turkish form of the scale consists of three sub-dimensions: distributive justice, procedural justice and interactional justice. In the original form of the scale, Cr α = .74 for distributive justice sub-dimension, Cr α = .85 for procedural justice sub-dimension and Cr α = .92 for interactional justice sub-dimension were reported (Niehoff & Moorman, 1993). The Turkish form of the scale has Cr α coefficients, distributive justice .81, procedural justice .89, and interactional justice .95. The reliability coefficients obtained for the sub-dimensions of the scale with the test-retest reliability determination method are .44, .65 and .73 for distributive justice, procedural justice and interactional justice, respectively (Yıldırım, 2002, 2007). Within the scope of the present study, Cr α reliability coefficients for the sub-dimensions of the scale were determined as .85 for distributive justice, .92 for procedural justice and .97 for interactional justice.

Perceived Stress Scale. In the scale developed by Cohen, Kamarck and Mermelstein (1983), there are 14 items that can be graded in 5-Likert type. This scale also has two separate forms with 10 and 4 items. In the present study, the 10-item form of the scale was preferred. The reliability coefficient of the scale, which was adapted into Turkish language by Örücü and Demir (2008), was reported as Cr α = .82 and test-retest reliability as .88. The scale has a two-factor structure: perception of stress/discomfort and insufficient self-efficacy. The reliability coefficient of the scale was determined as Cr α = .84, in the current study.

Leader Support Scale. The scale developed by Netemeyer, Boles, McKee, and McMurrian (1997) consists of 5 items that can be graded in a 5-point Likert type. The reliability coefficient of the scale was reported as Cr α = .87. Later, the reliability coefficient of the scale used by Ackfeld and Coote (2005) was reported as Cr α = .89. The reliability coefficient of the scale, adapted to Turkish language by Çelik and Turunç (2010), is Cr α = .95. Within the scope of the

present study, the reliability coefficient of the scale was determined as Cr α = .97.

2.4 Data analysis

Mean (M), median (MED), mode (MOD), skewness coefficient (SC) and kurtosis coefficient (KC) were used in reporting the descriptive statistics for scale scores. The Pearson correlation was used to determine the relationship between variables. Multiple regression analysis was used to determine the degree that organizational justice, perceived stress and leadership support variables predict teachers' job satisfaction.

3 Results

Descriptive statistics on teachers' job satisfaction, organizational justice, perceived stress and leader support variables are presented in Table 1.

Table 1

Descriptive statistics on research variables

Variable	*M*	*MED*	*MOD*	*SC*	*KC*
Job satisfaction	77.26	78	80	-.48	.35
Organizational justice	73.00	75	75	-.39	-.25
Perceived stress	26.83	27	30	-.24	.30
Leader support	18.23	20	20	-.84	-.23

Table 1 shows that the SC and KC of teachers' job satisfaction, organizational justice, perceived stress, and leader support scale scores are within ± 1 limits. These values which are within ± 1 limits indicate that the scale total scores do not show an extreme deviation from the normal distribution (Cohen et al., 2011; Muthén & Kaplan, 1985). After the variables in the data set provided the assumption of normality, Mahalanobis distances were calculated for the multivariate outlier analysis and the obtained values were compared with the critical value of chi-square χ^2 16.266 for α=.001 and degrees of freedom (df) 3. All the values obtained from the scales are below this critical value. This indicates that there are no multivariate outliers in the data set (Tabachnick & Fidell, 2007). The linearity and normality assumptions of the relationship between the predictor variables and the dependent variable (job satisfaction) were examined through graphics. The scatter plot obtained for standardized residual values and standardized predicted values defines a linear relationship and the points are collected around the axis. The histogram and normal distribution curves obtained for the standardized predicted values have approximately normal distribution (Interested readers can contact the corresponding author for more detailed information on the test of assumptions).

In the multiple regression analysis, the correlation values between the predictor variables were examined in order to determine whether there was a multicollinearity problem between the predictor variables (see Table 2). For this purpose, variance ratio related to a predictor variable that unexplained by other predictor variables (Tolerance), variance inflation factor (VIF) and condition index (CI) values were examined (see Table 3).

Table 2

Correlation values for the variables

	Job satisfaction	*Organizational justice*	*Perceived stress*	*Leader support*
Job satisfaction	1	.70	-.34	.40
Organizational justice		1	-.32	.46
Perceived stress			1	-.20
Leader support				1

When the bivariate correlations between the predictor variables and the dependent variable were examined, a positive and high level of relationship (r=.70) was found between organizational justice and job satisfaction, while controlling for other variables, this relationship was calculated as r=.60. While there was a negative and moderate relationship (r=-.34) between perceived stress and job satisfaction, this relationship was calculated as r=-.16 when other variables were controlled. While there was a positive and moderate relationship (r=.40) between leader support and job satisfaction, this relationship was calculated as r=.12 when other variables were controlled. Table 2 showed that the correlation values between organizational justice, perceived stress and leader support variables are below .90. These values show that there is no multicollinearity problem between the predictor variables (Tabachnick & Fidell, 2007). Tolerance, VIF and CI values for the predictor variables are presented in Table 3.

Table 3

Multicollinearity statistics of the predictor variables

Variable	*Tolerance*	*VIF*	*CI*
Organizational justice	.74	1.36	6.52
Perceived stress	.89	1.12	10.27
Leader support	.79	1.27	19.44

Table 3 shows that among the multicollinearity statistics related to organizational justice, perceived stress and leader support variables, Tolerance values are greater than .20, VIF values are lower than 10 and CI values are lower

than 30. These values show that there is no multicollinearity problem among predictor variables (Büyüköztürk, 2011).
After examining the normality assumption of the data set, multivariate outliers, and multicollinearity problems, a multiple regression analysis was performed to determine the predictive levels of the variables on teachers' job satisfaction and the results are presented in Table 4.

Table 4

Multiple regression analysis results related to predicting job satisfaction of teachers

Variable	*B*	B_{SE}	*β*	*t*	*p*
Constant	44.798	3.608	-	12.415	.000***
Organizational justice	.487	.033	.612	14.763	.000***
Perceived stress	-.253	.080	-.119	-3.152	.002**
Leader support	.202	.084	.096	2.403	.017*
$R = .71$	$R^2 = .504$				
$F_{(3, 392)} = 132.88$	$p = .0000$***				

* p < .05, ** p < .01, ***p < .001

Table 4 showed that the variables of organizational justice, perceived stress and leader support together give a high and significant relationship with teachers' job satisfaction scores, R = .71, R^2 = .504, p < .01. The specified three variables explained approximately 50.4% of the total variance in teachers' job satisfaction.
Based on the standardized regression coefficients (β), the relative order of importance of predictor variables on teachers' job satisfaction is organizational justice, perceived stress and leadership support, respectively. In addition to this, t test results for the significance of regression coefficients showed that organizational justice, perceived stress and leadership support are all significant predictors on teachers' job satisfaction.

4 Discussion and conclusion

The present study evaluated the roles of organizational justice, perceived stress, and leader support variables in predicting teachers' job satisfaction. The results of the study showed that organizational justice, perceived stress, and leader support were significant predictors of teachers' job satisfaction. The relative importance of the variables in predicting job satisfaction was organizational justice, perceived stress and leader support respectively, and the predictive variables explain about 50.4% of the total variance in teachers' job satisfaction.
Within the scope of the study, the most crucial variable in predicting teachers' job satisfaction is organizational justice. In addition, there is a significant positive and high level relationship between teachers' job satisfaction and organizational justice. The results of this study show consistency with the

findings of other studies on teacher samples (Altahayneh et al., 2014; Dundar & Tabancali, 2012; Kılıç, 2016; Nojani et al., 2012; Tanrıverdi & Paşaoğlu, 2014; Zainalipour et al., 2010) and with the findings of studies on other profession samples (Al-Zu'bi, 2010; DeConinck & Stilwell, 2004; Kılıç, 2016; Eker, 2006; Özen-Kutanis & Mesci, 2010; Netemeyer et al., 1997; Yıldırım, 2007).

Organizational justice generally refers to the perceptions of employees on whether they are treated fairly in the workplace (Moorman, 1991), the distribution of the organization results (e.g. salary, promotion, workplace discipline, etc.) fairly (Cohen-Charash & Spector, 2001; Colquitt et al., 2001; Cropanzano et al., 2007), the fairness and accuracy of the procedures and policies used for achieving these results, and the degree of courtesy, dignity and respect shown to them during these practices (Colquitt et al., 2001; Greenberg, 1990). In this sense, teachers care about the fairness of the decisions taken at school, the fairness of the procedures and policies, and the behaviors of the administrators towards them and other employees. It is reported that teacher job satisfaction has a positive effect on the quality of education, students, teachers and schools (Michaelowa & Wittmann, 2007), increases employee performance and organizational commitment (Bağcı, 2013; Candan, 2014; Cohen-Charash & Spector, 2001), and reduces turnover tendencies (Demircan-Çakar & Yıldız, 2009). Considering these positive effects as well as the current research results, it may be suggested to the administrators and policymakers that they should prioritize practices aimed at ensuring and improving organizational justice (e.g., being fair in syllabus, shifts, rewarding and disciplinary procedures, ensuring active participation of teachers in decision-making processes, providing trainings to develop effective communication skills, positive feedback etc.).

Within the scope of the research, the second priority variable in predicting job satisfaction is perceived stress. Teachers attached more importance to organizational justice than a personal variable such as perceived stress. This result is consistent with some research results in the literature (Adera & Bullock, 2010; Turunç et al., 2010) and can be addressed from two different points of view. First, employees spend most of their lives in the workplace. Employees who have a positive perception of organizational justice have positive perceptions of the organization, high levels of success, and high performance indicators (İyigün, 2012). Therefore, positive perception of organizational justice can alleviate the adverse effects of personal variables such as stress on individuals. The second is the relationship between job satisfaction and life satisfaction. Life satisfaction generally refers to the whole of individuals' perceptions of their own lives (Avşaroğlu, Deniz, & Kahraman, 2005). Considering that employees with high job satisfaction may also have high life satisfaction, it can be stated that they cope with the adverse effects of stress. Ünal, Karlıdağ, and Yoloğlu (2001) stated that job satisfaction is the variable that has the most significant effect on life satisfaction. On the other hand, low job satisfaction in the teaching profession results in absenteeism or job change.

Absenteeism in the teaching profession such as getting permission and medical report, not being able to conduct educational activities results in cuts in wages. In addition to this, changing jobs is seen as changing schools or changing professions. However, changing a profession is related to the economic and employment level of the country, individuals may not consider to change their jobs even if their job satisfaction is low (Özkalp & Kırel, 1996). If teachers do not change jobs, this may cause them to encounter frequent mid-career crisis (Kyriacou, 2001). The stress seen in the individual as a result of job dissatisfaction can affect the relationships with the leader and colleagues and the perceptions towards the organization. In addition, the communication and treatment of managers in the implementation of organizational justice also affects employees' perceptions about stress (Swandarujati et al., 2019). The current study revealed that a significant negative and moderate relationship was found between the teachers' perceived stress and job satisfaction. Similar results have been reported in studies conducted with teachers (Hassard et al., 2017) and other samples (Sert et al., 2014). The negative relationship between teachers' perceived stress and job satisfaction indicates that practices aimed at reducing teachers' perceived stress can have positive effects on job satisfaction. In addition, ensuring and developing organizational justice in schools can make positive contributions to decrease the stress perceived by teachers and increase their job satisfaction. Considering that teaching is among professions that experience the highest level of work stress (Stoeber & Rennert, 2008), school administrators should prefer approaches based on courtesy and respect in their communication with teachers, consider stress, job satisfaction and organizational justice relations, and in this sense, practices that will reduce the stress of employees may be suggested to turn.

According to the relative importance level, leader support comes after organizational justice and perceived stress variables in predicting teachers' job satisfaction. Since the multidimensional structure of organizational justice (i.e. distributive, transactional and interactional justice) evaluates all transactions and processes within the organization, this result can be explained by evaluating the attitudes and behaviors of leaders towards the organization by employees through the scope of organizational justice. Çoğaltay et al. (2014) reported that educational leadership has a moderate positive effect on organizational justice. Additionally, it was found that there was a significant positive and moderate relationship between leader support and job satisfaction. As suggested by the results of the studies focusing on various occupational groups the leader support has a positive impact on professional development, empowerment and job satisfaction (Ackfeldt & Coote, 2005; Fernandez, 2008; Kale, 2015; Tengilimoğlu & Yiğit, 2005). Within the scope of the research, a significant negative and moderate relationship was determined between leader support and perceived stress. Similarly, Osunka and Unachukwu (2020) reported a negative relationship between leadership support and teachers' perceptions of work-

related stress. In general, the inability of the principals to establish a positive and constructive colleague relationship with the staff creates an atmosphere of insecurity and anxiety that can expose teachers to high stress (Lambersky, 2016). School principals' attention to the needs of teachers and providing them support may help to increase the job satisfaction (Ackfeldt & Coote, 2005). Therefore, school administrators' providing teachers with a working environment in which they feel safe and can express themselves comfortably, taking into account the needs of teachers will help teachers to make positive contributions to their job satisfaction levels.

In addition to its contributions to the literature, the research also has some limitations. Basically, correlational research results can be useful to reveal the existing relationships between variables, but it should be emphasized that these relationships are not causal ones. Furthermore, the use of convenience sampling method among non-random sampling methods can be considered as another limitation. However, the consistency of the relationships determined between the variables considered within the scope of the study with the existing literature indicates that the bias due to this limitation is relatively low.

As a result, it can be suggested that the order of relative importance in educational policies and practices that will take teachers' job satisfaction into account should be structured as organizational justice, perceived stress and leader support. However, it is thought that holistic approaches that include all variables can be more effective, since variables of organizational justice, perceived stress and leader support are significantly associated with teachers' job satisfaction. On the other hand, the specified variables explain 50% of the variability in teachers' job satisfaction and there is still a 50% part that cannot be explained. Therefore, it can be suggested to future researchers to conduct research by choosing variables for this unexplained part of teachers' job satisfaction. In addition, since the current research has been carried out with teachers working in the public sector, different results can be obtained with a study involving teachers working in the private sector.

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Formation of Art Design Skills (Crossover Point) in the Process of University Education

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Abstract:
Introduction: The actualization of crossover point design activities in modern artistic practice is due to the growing mass demand for entertainment. The musical and theater project involves the introduction of new technologies. Creation of synthesized art "crossover-projects" requires the efforts of a group of managers and performers, taking into account the demands of the art market, their complex perception by a wide audience, and non-traditional approaches to staging classical works, taking into account the peculiarities of the location.
Purpose: The purpose of the paper is to characterize art "crossover-projects" in the context of present culture and to reveal the method of preparation of future specialists to art design during getting university education. The article analyzes the methodology of training future specialists for art design in the process of their university education. The need for such an approach is due to the fact that the functioning of artistic culture in public practice is carried out in accordance with the laws of business, in which the commercial component is of decisive importance. Modern art projects have a high cost, as they involve the support and participation of creative individuals and groups.
Results: The growing demand for modern cultural projects containing a creative search, creative component has made it necessary to introduce the corresponding disciplines into the KNUKiM (Kyiv National University of Culture and Arts) curriculum for master students of creative specialties (audiovisual art and production, theatrical art, musical art, choreographic art), as well as design protection of graduation work in the form of a master's creative project. The formation of a creative project within the framework of a master's program is an important element of the formation of skills of the theorist and the practice of artistic culture in their harmonious combination.
Discussion: The phenomenon of design activity - "crossover point" and its distribution in modern artistic practice are characterized. Their polyfunctionalism, "manufacturability" and focus on mass character

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induce to creative methods that are not burdened with the experience of the past. Indicative in this respect is the design activity of Filevskaya - art manager, sponsor of many projects dedicated to Ukrainian avant-garde art, founder of the public organization “Malevich Institute”. Her work fits into the concept of "crossover projects".
Conclusion: Preparation for art design within the framework of university education provides for the necessary lines of intersection of various art branches, specialties and specializations, encouraging students to create a synthetic artistic product at the intersection of various types of arts and aesthetic and artistic traditions, since the "purity" of art is no longer a criterion for creativity and professional success.

Key words: design activity, “crossover point”, art projects, synthesis of arts, design in the field of culture.

Introduction

Actualization and dissemination of design activities in modern art practice is due to the growing mass demand for entertainment. A musical-theatrical project is a new form of creative activity that involves a combination of several arts and is based on use of new technologies. Creation of synthesized art "crossover-projects" requires the efforts of a group of managers and performers, taking into account the demands of the market of artistic needs, their comprehensive perception by a wide audience, unconventional approaches to producing classical and modern plays according to location. Art culture functions in modern social practice in accordance with the laws of business, in which the commercial component is important and sometimes crucial. The cost of modern art projects is quite high, because their implementation requires the support and participation of creative individuals and groups. Appeal to creative techniques, not burdened by the experience of the past, provides it (projects) multifunctionality, "manufacturability" and focus on the masses. Stanislavska (2016), Saenkova (2003), Sklyarova (2017) study different types of spectacles, as well as the latest trends in the development of entertainment culture due to the latest information technologies.

Training of specialists in art design within the university education involves provide the necessary intersections of different arts, encouraging students of several specialties and specializations to create a synthetic art product at the intersection of different arts and aesthetic traditions, because the "purity" of art genres is no longer a criterion of creativity and professional success.

1 Research

With the development of media and communication technologies, the leading trends in the culture of the early 21st century, the difference between elite and

mass art is practically leveled. The traditional art forms and artistic practices are influenced by mass, popular culture. The desire to meet the mass demand for entertainment gives rise to synthesized artistic "crossover projects". Goal and tasks of the article - to characterize art “crossover-projects” in the context of present culture and to reveal the method of preparation of future specialists to art design during getting of university education.

In their origins, these phenomena are connected with the concept of "Gesamtkunstwerk" by Wagner - the synthetic art of the future, with the idea of the future synthesis of Scriabin - "auditory polyphony" (auditory), with "sessions" by Mallarmé, with the art of "eurythmy". Steiner, with compositions by Kandinsky, etc. At the beginning of the 20th century, these ideas brought to life spectacles, complex in structure, designed for a comprehensive perception of a fairly wide audience. Such artifacts are created by the efforts of a group of managers and performers in accordance with the demands of the art market.

Characterizing such art projects, it is worth noting, first, that they do not have clear genre features, and secondly, they widely use up-to-date technical means of expression and non-traditional plays of classical works, taking into account the peculiarities of the location, which dictates the techniques needed to solve a particular artistic problem.

The project is a plan, idea, development, etc. (Dictionary of foreign words, 2008). Borrowed from technical disciplines, in the practice of the art market it has acquired a new meaning: it is not only a plan, but also an idea, preparation and implementation in various formats of "consumption" of a work of art. Thus the etymology of the word sometimes comprehensively reproduces the basic meanings of being, real and possible. The concept of "crossover-point" translated from English means the point of intersection, crossroad and cross-combination, it appears as a methodological principle in the study of the synthetic nature of art projects common in modern cultural and creative activities. This approach enables to consider multi-vector and multi-sectoral activities in their synthesis, which creates a model ("ideal type") of a modern art project. The logic of the theory of "crossover point" encourages to "fit" the design activities into the cultural context, to identify such conceptual aspects as "cultural potential", "socio-cultural demand", "aesthetic-artistic and ethical-educational orientation", "commercial component", "recreational-interesting component", etc. In the context of art culture, the term "project" is understood not as a certain original plan, but as a unique set of coordinated experimental actions of masters of art culture, combined for a certain time within a certain cultural location to solve specific artistic problems.

The availability of art culture in present conditions, including classical, is carried out in public practice in accordance with the laws of business, in which the commercial component, as well as the role of the producer, are crucial. The producer's work in the project combines commercial and aesthetic-artistic components: it defines the tasks and functions of the means of expression, the

role of conditions in which a certain artistic action will take place, the audience, the duration of the project life cycle attracting modern technologies.

As is know, a certain number of spectators turn to classical art for cognitive purposes - to get important information and gain new sensory experience. For them, this is an opportunity to learn about high culture. At the same time, the creation of design plays on the models of world classics is a promising way to form a world artistic "crossover" - space - in fact, the space of spirituality.

Classical art, including music, has entered the modern media-communicative space quite organically, in which both the music of the "third layer" (jazz-rock-pop music and classical, available here in the form of transcription), paraphrases, processing or free reading, and re-intonation is widespread, etc. Due to this, the modern musical-theatrical project, created on the basis of classical repertoire, including opera, acquires new features, including features of the spectacle "crossover" - character, modern mass culture addressed to the widest possible audience. Among them there are only a small number of connoisseurs and admirers of high art.

Its implementation requires not only producers, directors, performers, but also the appropriate audience, ie mobile, limited in a certain space-time composition of implementers-performers-receivers, built within a certain specially selected location, suitable for this action. In addition, the established, stationary forms of existence of a certain art form are undergoing changes. The spatiality of the project is its constant feature, which presupposes the ordering of all other components.

According to the Dutch philosophers Timothy Vermeulen and Robin van den Acker, the currently applied principles of the organization of the artistic space are the defining features of the goal of modernism. They believe, if modernism expresses itself through utopian syntax, then postmodernism, through hopeless parataxis, metamodernism, obviously expresses itself as an a-topical metataxis. The Greek-English lexicon translates atopos (ατοπος) as strange, extraordinary, and paradoxical. However, most theorists and critics insist on its literal meaning: a place (topos) for which there is no place. We can thus say that the atopos is both a place and a non-place, a territory without borders, a position without borders. We have already described metataxis as being here, there and nowhere at the same time. In addition, taxis (τάξις) means ordering. Thus, if modernism presupposes temporal ordering and postmodernism a spatial disorder, then metamodernism should be understood as space-time, which is at the same time neither in order nor in disorder. Metamodernism replaces the boundaries of the present on the verge of the infinite future; replaces the boundaries of familiar places with the description of the infinite. In fact, this is the "fate" of metamodern man: to pursue horizons that recede endlessly (Vermeulen, & van den Acker, 2015).

In the context of these reflections connected with creation of artistic projects, the most significant is the tendency to find and use experimental hubs, including a

modern exhibition center, museum site, city center - from ancient ruins to specially built summer theaters, parks, etc. as intersections of various cultural loci (artistic, public, hierotopic, etc.). So, it is about solving specific tasks of the original art project.

This captures a situation in which a new round, a leap in the development of key ideas in culture, similar to those common at the end of the last century. According to the Latin proverb ("after - means due"), it can be argued that after and due to postmodernism in the culture of the 21st century, the position of playful, but not gambling, but calm, without pathos, sorting out cultural variants of previous eras, when unambiguous choice does not only make sense - it is simply not possible. This is an ideology that "justifies" a new erosion of "repressive" boundaries and limits between species, genera, genres, and most importantly - between forms of cultural activity. A new state of culture, when not only lyrics, epics and drama, not only poetry, painting, theater and other arts, but also creativity and business, performers and the latest technologies are eclectically combined.

Despite the "youth" of various manifestations of design activity in art, it is these phenomena that form today the "tonatmosphere" of the cultural life of society. Without these, sometimes unexpected, one-time cultural and artistic actions, it is impossible to imagine the worldview, mentality, well-being of the "avant-garde layer" of the intellectual elite, creative personalities who embody the certain features of mass consciousness in (post-) industrial society.

So, we enter the (super-, post-) information society and similar phenomena reflect its, perhaps, the first (yet immature) phase, when adequate ways of "taming" the arbitrariness, selfishness and greed of media owners are practiced, unprincipledness of critics and journalists, when feedback is established between consumers of information and its producers, when the intellectual and moral level of consumers does not yet ensure their influence on these processes.

Such changes in culture are very slow. Since the end of the 20th century, with the beginning of the information age and transformations in the field of culture, due to modern information technology, the number of figures in the field of mass communication and "current" culture has increased unprecedentedly. Now, the deformation of cultural activity, unique in its scale and depth, has unfolded. On the one hand, it resembles the "feuilleton era" described by Hesse (1969, p. 46) in his novel The Game of Beads: "It was then that terrifying insecurity and apathy began to spread among intellectuals; and spiritual needs and achievements rapidly fell to a very modest level." And further: "The path to public recognition, honor, fame and comfort now leads not through classrooms, seminars and doctoral dissertations: extremely declining intellectual professions then went bankrupt in the eyes of the world… Those talents, who sought brilliance and worship, were destined to turn away from boredom ungrateful spirituality and devote themselves to other activities in which their destiny was to earn money and prosperity." (Hesse, 1969, p. 56)

On the other hand, the worldview and thinking of man at the beginning of the new millennium is undoubtedly more meaningful. This leads to the analysis of the game as a cultural phenomenon, started by Geising and actively continued by foreign and domestic researchers in modern cultural discourse.

"Gamification" ("grogification") permeates and transforms the modern cultural space, encouraging the interactivity of all participants in the process of cultural creation. It should be noted that in Scandinavia, game forms in school and university forms of education have long been recognized at the legislative level. These questions arise every time you reflect on the radical changes in culture that we are witnessing and that appeal to the long-standing debate about the role of play in culture. Some experts consider the game a cultural element; others are convinced that the game devalues the serious in culture and art.

In this regard, the opinion of a famous scientist about the activities of modern museum institutions as components of the socio-cultural sphere cannot fail to attract attention. It can rightly be extended to cultural and artistic institutions. Tomislav Shola in his work “Eternity does not live here any more. A glossary of museum sins.” Shola (2013) emphasizes that the modern spectator, listener, visitor of the museum, concert hall, exhibition, seeks to feel a participant in dialogue, communication, during which elements of education and entertainment, emotional uplift are used and rich informativeness, after all, of art and real life. It is, in fact, about the gamification (gamification) of cultural activities, about the introduction of the game in a non-gaming context. This experience has entered the modern artistic discourse and radically changes the principles of current cultural and artistic practice.

The state and needs of artistic culture, the scientific and technological revolution that began in the second half of the 20th century, underwent informational and later electronic transformations, today they are in the phase of "nanorevolution", creating fundamentally new conditions not only for changing genres of art culture, and their embodiment. New technologies have contributed to the unification and, subsequently, the globalization of artistic processes. Nowadays we can talk about new formats of "consumption" of artistic products, directly due to the latest technologies, about their entry into the cultural and artistic market.

To create such artistic products, in addition to authors and performers, a new community of interdisciplinary specialists is needed (and accordingly already formed). It turned out that the profitability of the creation of the created artistic product increases significantly if it is produced in different formats of consumption. Therefore, around the creative group of authors and performers began to form a team of managers under the leadership of the producer as the main person who takes all the risks possible during the life cycle of the creative idea. The figure of the producer begins to play the role of regulator of economic relations. The process of planning, creating and implementing a set of

synthesized cultural and artistic products, united by a common concept, has been known as a project.

A. Maslow, a well-known researcher on the "self-actualization" of personality, said in particular: "We must understand that the future is the only thing that is in principle unknown and unknowable, which means that all habits, all mechanisms of defense and attack - are questionable and have a double meaning because they are based on past sensations. Only a flexible creative person can truly control the future, only such a person can confidently and fearlessly look in the face of novelty." (Maslow, 2016, p. 6). These words convince us how seriously in modern cultural theory in the conditions of the end of "despotism" of any form, especially in art, such phenomena are comprehended.

Now, the established tradition of depriving an object of the context in which it is perceived, "pulling" it out of the environment, cutting off natural connections with space-time, in which certain actions, actions, events of cultural and artistic significance take place, loses its indisputability. After all, as Shola (2013, p. 37) writes: "Without a 'broth' of myths, beliefs, ambitions, aspirations, life, historical events and destinies, in which objects are usually immersed (whether art actions, events… - we will add), they mean little."

The concept of context has become a key in understanding the existence of art in the situation of the" beginning of the century ". It can now be argued (according to Nelson Goodman, whose ideas form the basis for further philosophical modeling of the world) that knowledge of the plurality of worlds, their dependence on the symbolic systems we construct, the diversity of standards of correctness to which our constructions obey in the Preface to "Ways of Building the World" emphasizes: "This book belongs to the dominant trend of modern philosophy, which began when Kant replaced the structure of the world with the structure of consciousness, continued, when K. I. Lewis replaced the structure of consciousness with the structure of concepts, and when the replacement of the structure of concepts with the structure of several symbolic systems of science, philosophy, art, perception, and everyday discourse began. This movement is directed from one single truth and one from the beginning of this world to the process of generating a variety of correct and conflicting options or worlds." (Goodman, 1968, p. 5).

At the turn of the 19th and 20th centuries, the American sociologist Veblen introduced into scientific circulation the concept of demonstrative consumption. In this way, he signified the desire of man to receive everything at the highest price and, thanks to this type of consumption, to join the elite samples of artistic products, which are considered "filters for sifting the elite." Attending prestigious art events confirms the idea of a slow but relentless process of popularizing elite taste. This leads to a gradual mixing and intertwining of those social institutions and forms that were previously considered mutually exclusive. The cultural industry is also reorienting to this type of consumption. Thus, a high-quality art project can significantly affect public life with its

multidirectional, synthesized, syncretic, large-scale nature; long remain in the memory of the target group for which it was intended.

Art project can be considered relatively separate, holistic activity. It is based on the latest artistic idea, and at the same time - a certain innovative and technological idea, a clear calculation of efficiency in direct connection with the algorithm to achieve the goal due to appropriate resources and performers, i.e. factors of tangible and intangible nature.

Art projects have a high "cost", because their implementation requires the involvement of various spheres of society, support and participation of creative individuals and teams. Hence the purpose of such art projects - to create aesthetic, artistic and moral-educational communication space, to educate people "cultural". The authors of these projects depart from any clear genre and style criteria and resort to individual decisions in accordance with a certain goal, choosing the appropriate means of expression. It is another matter that the historical and cultural aspects of each project actualize other types of human artistic activity: from ancient plays - theater, music, even "agon", to medieval liturgies, mysteries and carnivals, to classical art and spectacles of New times, and finally to modern and postmodern manifestations of artistic culture.

A modern art project, which includes, among other things, the introduction of the latest audiovisual technologies, promotes the spread of new, global art genres or meta-genres (gala concerts, light and sound performances, electronic extravaganzas, cinemasymphonies and other synthesized-syncretic plays), which not provided for traditional classification. These art projects perform aesthetic and ethical-educational, recreational and training functions.

The design activities of Tetyana Filevska, art manager, sponsor of many projects dedicated to Ukrainian avant-garde art, founder of the public organization "Malevich Institute" can be considered as indicative. Her work fits directly into the concept of "crossover-projects", because it corresponds to the main principle - the synthesis of several activities: art-search, art-education and art with the creation of a locus of events. Its diverse projects connect both the professional expert community and the general public. Polyfunctionality, cultural nature of art projects, their "technological" and focus on the masses encourage to resort to creative techniques not limited by the experience of the past. Such guidelines and principles are fully embodied in her project work of Filevska, which began with the discovery of "Ukrainian Malevich": the reconstruction of the artist's biography of teaching at the Kyiv Academy of Arts with subsequent immersion in the "biography" of the artist, full of Ukrainian realities. The question arises: why the interest in the creative biography of the great artist prompted her to project activities? In fact, this is the difference between Filevska as a researcher and many other biographers of the artist. The answer is obvious - she creates an extensive network of projects around scientific research precedent (which is the search and analysis of new archival materials, cultural connections and contexts) - actions, creative competitions, publishing, exhibitions, lectures, seminars with

their information support and establishing an appropriate mechanism of interaction, PR (within both domestic and foreign institutions) (Statute of the community organization "Cultural Assembly, 2016, p. 32). This crossover paradigm of projects gives fruitful results and arouses interest: any cultural event turns into "fashionable" prestigious content, launching in one location a synthetic machinery of ideas, personalities, events, arts. For example, the international conference of 2016 "Kazimir Malevich: Kyiv aspect" was organized and held, which did not "fit" into the usual model of such events. On the contrary, the Malevich Institute managed to properly organize and hold several daily celebrations (in various cultural locations in Kyiv). The organizers invited representatives and figures of different cultural and artistic spheres to participate, created a synthetic action based on different types and genres of art: painting, music, cinema, the newest media, and design installations. This created a background for intellectual content and communication. The informational coverage of the project also seems unconventional due to the proper discursive platform, which helped to transform the intellectual event into a unique cultural and artistic event that interested and encouraged the public.

The activity of the Malevich Institute gives an opportunity not only to discover and understand the essence of various cultural and artistic projects; it encourages new project ideas, to determine the perspective of cultural creation.

2 Results

The growing demand for modern cultural and artistic projects, which contain creative and exploratory, the latest creative component, prompted to introduce into the KNUKiM's curriculum for graduates of master's degrees in creative directions of relevant subjects (audiovisual arts and production, theater, music and dancing) also design-defense of qualifying work in the form of a master's creative project. Developing a creative project within the master's program is an important form of acquiring the skills of a theorist and a practitioner of art culture in their harmonious combination. Often the weakest link in this design is to convey the main idea to the "customer", its actualization and specification of resources and means of implementation. The main attention at this stage is paid to the definition of such a component as "concept-implementation". This line is complicated by the involvement of synthesized elements in the production of the project. So, the students must demonstrate mastery of modern art practices, as well as technologies for creating the so-called conceptual package, which provides for the availability of scientific publications in Ukrainian and foreign specialized scientific journals, abstracts at international and national conferences, symposia and round tables. These materials should contain a theoretical substantiation of the main idea of the project, an understanding of the axiological significance in the model of a particular cultural situation, as well as reveal the history of the origin and development of the concept and possible

options for its current and future development. This conceptual training is due to the fact that the modern project involves the intersection (crossovers) of different approaches, principles, the synthesis of which provides a new artistic product.
Masters must acquire professional skills to independently apply the acquired knowledge in solving specific artistic, scientific, organizational and other tasks. It is necessary to recognize the dialectical interaction of these areas of work, which, according to teachers-managers of project activities of KNUKiM students, is impossible within such a sequence. In some cases, the procedurality of the full creative cycle is due to the fact that students start from seeing and understanding the essence of the final product, and then find the "reverse" way - to its conceptual core. In other variants, on the contrary, theoretical, conceptual competence encourages the creation of original project works. In each case, the important element is a way (here and the method) of independent implementation (ie practical implementation) of the idea, originality and expediency of creative solution. But most importantly, the project should convince that it is not only important for the creators, for the department and faculty, but also meets modern socio-cultural needs. In fact, this is the so-called socio-cultural value of the project.

3 Discussion

Implementation of art design within university education allows the necessary lines of intersection (again, social crossovers) of different arts, specialties and specializations, to adhere to the necessary conditions of modern artistic career - to prepare and encourage students to create a synthetic (therefore relevant) art product at the intersection of different types of arts and aesthetic and artistic traditions ("purity" of art is not a modern criterion of creativity and professional success). Therefore, the master's project is a great opportunity for such a professional synthesis-crossroads.
It should be noted that the design approach to the preparation of master's theses is fundamentally different from the traditional openness to further creative and professional implementation in today's creative industries. It is constructed as a matrix-principle, the application of which is universal. In addition, the new principles of preparation of a creative project led by theorists and practitioners form an ideal model for combining research (analytical and theoretical-methodological) and experimental (practical) work. Each master's project is demonstrated publicly, accompanied by an explanatory note and a complete conceptual package, and has an indicator of effectiveness as an accomplished rather than a traditional "stillborn" due. The artistic professionalism of graduates, which the university strives to achieve as the ultimate goal of the educational process, is manifested in the fact that they do not avoid the naturalness of life's drunkenness and unprogrammed creative. Focus on design is a living

combination of ideas, intentions, skills, beliefs and professionalism of the "university corporate mind".

Conclusion

Thus, the term "project" in the context of artistic practice means not only as a result of the original plan, but as a unique set of coordinated actions aimed at achieving a specific cultural, aesthetic and artistic goal. Throughout history, there is an active search for new forms of artistic creativity to reflect and comprehend the changing reality. Art projects have become a logical manifestation of cultural development. Design activity in the field of culture at a new level "connected" Ukrainian art to world art trends, fully changed the picture of the existence of Ukrainian art culture. Art projects are a new form of syncretic-synthesized play and phenomenon mediated by the peculiarities and realities of world culture of the early 21st century.

Finally, here are the words of the prominent philosopher Ortega y Gasset: "The Faculty of Culture produces a certain type of scientific character, which previously developed by chance - integrative talent" (Ortega y Gasset, 2005, p. 59]. This talent, as the Spanish thinker explains, lies in the ability to create integrity. In the context of the article, "design integrity" is understood as intersections of design construction of ideas and their results ("crossover points"), multi-vector, but aimed at the current future, which reveal the potential and social significance of cultural and creative practice.

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EFL Teachers' Sources of Remote Teaching Anxiety: Insights and Implications for EFL Teacher Education

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Abstract:
Introduction: This study aims to explore an under-researched issue; namely, remote teaching anxiety.
Methods: This study employed a sequential mixed-methods exploratory design where participants initially reported their remote teaching anxiety sources and then rated each. For the analysis, inductive content analysis and statistical tests were employed.
Results: The content analysis revealed two major themes: digitalisation-related concerns and online pedagogy-related concerns. Statistically significant difference was only found between anxiety sources and online teaching experience but not between gender, age, teaching experience, work setting and anxiety sources.
Discussion: Several studies (Çoklar, Efilti, Şahin, & Akçay, 2016; Hassan et al., 2019) found digitalisation-related concerns causing stress among teachers; however, remote teaching anxiety remains an underexplored construct (Russell, 2020). Although online pedagogy-related concerns were found to cause teaching anxiety in our study, a recent study (Lazarevic & Bentz, 2020) found using technology helpful to decrease anxiety.
Limitations: The data were limited to the views of 96 EFL teachers in the Turkish context.
Conclusion: We can conclude that limited experience with remote teaching can contribute to higher anxiety among EFL teachers. Additionally, this research can contribute to the relevant literature with several implications on the future of language education.

Key words: anxiety, Covid-19, English as a foreign language, remote teaching anxiety, sources of anxiety.

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Introduction

As a result of the abrupt and extraordinary circumstances stemming from the novel Covid-19 pandemic, a serious impact was observed in the field of education (Liguori & Winkler, 2020). Schools and universities across the world were closed (UNESCO, 2020). This revealed and reaffirmed a longstanding potential challenge to education (Crawford, Butler-Henderson, Rudolph, & Glowatz, 2020). However, it seems that the new aspects of online teaching and learning have not yet been understood adequately, which created a norm rather than an exception in the form of emergency remote teaching (ERT). An area of research emerged for educational researchers: the exploration of the initial experiences related to ERT. We therefore focus our research on English as a foreign language (EFL) teachers' online teaching experiences related to teaching anxiety, which has been observed by the first author since the onset of the Covid-19 outbreak leading to a massive growth in online teaching in Turkey and the world.

Schools, as well as individual teachers, had to move courses online, which shifted the concept of learning to home-schooling behind computer screens, also qualified as 'online' or 'remote' teaching (Crawford et al., 2020). The two terms are used interchangeably within the scope of this study, meaning the new modality of ERT in concern. ERT was sustained without the physical presence of others in an unprecedented way globally. A small number of pedagogical studies introduced the transition in the related literature; in Turkey by Özer (2020), India by Lall and Singh (2020), Georgia by Basilaia and Kvavadze (2020), and across 20 countries by Crawford et al. (2020). As a very recent phenomenon, this abrupt and previously unplanned shift to massive online teaching has yet to be explored, particularly with more attention into EFL teachers' anxiety about such an emergency shift (Bollinger, 2017; Russell, 2020). In this context, we aim to reveal the potential sources of anxiety triggered by online teaching experiences of EFL teachers and to understand the degree to which the teachers were affected by each source. We draw on a set of qualitative data collected from 96 Turkish EFL teachers through an open-ended questionnaire that includes a broad question and a quantifying 10-likert scale. We addressed the following research questions:

1. What are the sources of online teaching anxiety reported by EFL teachers?
2. To what extent do they score these sources influencing their online teaching anxiety?
3. Do these scores show any statistically significant difference in terms of demographic variables?

1 Literature review

A wide range of digital technologies enables us to design and implement online teaching by generating a widespread impact on learning and teaching (Rodrigues, Almeida, Figueiredo, & Lopes, 2019). However, there are relatively few studies investigating online teaching anxiety as perceived by teachers (Russell, 2020), which is a gap this study addresses. Below we portray the construct of anxiety as well as affordances and constraints in online EFL teaching.

1.1 Challenges and opportunities in online teaching and learning

Teaching a foreign language by embedding Information and Communication Technologies is not a new phenomenon (Ellis & Calvo, 2007); however, it certainly remains challenging in many terms. The often-cited challenges in online education include the need for teachers to ensure satisfaction among learners (Picciano, Seaman, Shea, & Swan, 2012), embedding the required teaching tools to decrease students' anxiety in online learning (Russell, 2020), and employing accurate assessment and evaluation methods (Sahu, 2020). However, these challenges could stem from anxiety during ERT since neither learners nor teachers know how to overcome the challenges derived from the rapidly shifted modality of education. Hubalovsky, Hubalovska and Musilek (2019) argue that teachers' anxiety in online platforms stems from the need to deal with a variety of approaches, applications, processes and academic areas. Online education may require language teachers to be autonomous, creative, digitally literate, evaluative and good at monitoring the whole learning process and language teachers also need to know how to situate learning authentically in their own classroom (Driscoll, Jicha, Hunt, Tichavsky, & Thompson, 2012). It is also important to ensure continuous opportunities for interaction and information exchange (Ross & DiSalvo, 2020) as well as socio-emotional information and the autonomy to exercise choices (Paechter, Maier, & Macher, 2010). Accomplishing these roles in the new modality of teaching might cause stress and anxiety among EFL teachers.

While online education helps teachers become creative and unique, learners also start to become more critical and engaged in learning through technology-assisted learning (Young, 2003). Students' learning performance can be correlated with their anxiety levels and other technological competences. In a recent technology-assisted study, Yang, Lin, and Chen (2018) found that students with high-levels of anxiety performed worse in learning a foreign language than those with low-level anxiety. Language teachers could also consider such a debilitative effect of anxiety on their teaching performance mutually. Therefore, teachers should feel the need to be equipped for teaching online at satisfactory levels (Picciano et al., 2012). They also need to meet the objectives of the course, content, interaction and students' learning needs with the appropriate pedagogy (Driscoll et al., 2012).

During the ERT period, several studies have looked at the challenges of online education through language teachers' lenses and presented solutions. For example, Moorhouse and Beaumont (2020) suggested a 3-stage lesson sequence model starting with an offline pre-live lesson talk, followed by a live-video conferencing lesson, and ending with a post-live lesson talk over a learning management system. Kohnke and Moorhouse (2020) promoted an online synchronous meeting tool (Zoom) for augmenting interaction and letting introverted students to express themselves better. Taguchi (2020) argued teaching the pragmatics of digitalisation through structured (e.g. instructor designed games), semi-structured (computer learning partner), and unstructured (games or social networking sites) digital spaces. In addition, in their study mirroring the lessons learned at a language centre at Harvard University, Ross and DiSalvo (2020) suggested employing professional online communities for reflection on professional practice. On the other hand, Russell (2020) proposed that anxiety was felt by both teachers and learners during ERT and attempted to bring some research-based pedagogical techniques for teachers to help their students. The teachers as the sources of knowledge need to be researched first since they experienced anxiety as well. For this reason, the current study is one of the first to investigate an underlying phenomenon of the core of challenges (i.e. sources of online teaching anxiety) felt by EFL teachers during the transition from face-to-face education to online/remote education.

1.2 Anxiety in online EFL teaching

Temporary school closures could create both confusion and stress for learners as well as for teachers, since it can be highly challenging and frustrating to sustain support for learning on digital platforms (UNESCO, 2020). Such circumstances require further research-based evidence to generate knowledge that informs educational practices. We now discuss the previous literature drawing on anxiety as one of the key constructs in EFL teaching.

There are a wide range of sources of anxiety stemming from human and computer interactions in the educational field (Fernández-Batanero, Román-Graván, Reyes-Rebollo, & Montenegro-Rueda, 2021). In face-to-face education, Young (1991) identified personal reasons, learners and teachers' beliefs and their mutual interactions, classroom requirements, and assessment and evaluation causing anxiety. Due to the educational restrictions caused by the outbreak of Covid-19, learners and teachers have shown psychological reactions to their loneliness, resilience and resistance to the change through anxiety. Language teachers experienced anxiety due to the abrupt shift to online teaching. Recently, MacIntyre, Gregersen and Mercer (2020) have found that language teachers developed avoidant coping strategies, which correlated with stress, anxiety, anger, sadness, and loneliness. Although these negative outcomes stem directly from Covid-19, sources of such emotions need to be tackled. For example, anxiety in online EFL classrooms has not received sufficient attention

from researchers. With specific reference to Iranian EFL teachers' teaching anxiety, Aslrasouli and Vahid (2014, p. 304) found five categories of sources of anxiety: interpersonal relations, language proficiency and knowledge, facilities and resources, employment structure, and other factors. These sources in face-to-face modality show similarity to those evidenced in Turkey. For example, İpek (2016, p. 100) revealed five sources of anxiety of tertiary-level Turkish EFL instructors: "making a mistake, teaching a particular language skill, using the native language, teaching students at a particular language proficiency level and fear of failure. However, the anxiety construct might show a difference in the new modality on which research lacks empirical evidence. More recently, Russell (2020) has reported pedagogical techniques to deal with foreign language anxiety during ERT, but the report lacks evidence of EFL teachers' personal views. Similarly, other recent studies present only recommendations for language teachers to survive professionally in online education (e.g. Kohnke & Moorhouse, 2020; Moorhouse & Beaumont, 2020; Russell & DiSalvo, 2020, Taguchi, 2020). On the other hand, in their systematic review of 16 studies which were published before the outbreak of Covid-19, Fernández-Batanero et al. (2021) report that teachers feel stressful and anxious about using technology as an innovation due partly to lack of technology knowledge, technology insecurity, high levels of techno-stress and pressure to use technology. Compared to the dearth of studies investigating online teaching anxiety after Covid-19, the current study attempts to explore and explain the sources of online teaching anxiety among EFL teachers.

2 Methodology

2.1 Research design

Since the uniqueness of the circumstances suggests previously unexplored themes in online teaching anxiety, we decided to take a bottom-up approach. To do so, we adopted an exploratory inductive approach to capturing and collecting the online teachers' initial feelings of anxiety through a qualitative research perspective (Dikilitaş, 2015). Secondly, we employed a quantitative research method by asking the participants to rate their self-identified anxiety sources. For this purpose, we chose a sequential mixed-methods exploratory design for two reasons: (I) we did not know the instruments, variables and measures available for a population (Creswell, 2011) and (II) remote teaching was an emerging field of research during the implementation of this study. Therefore, we explored the phenomenon of anxiety in online teaching, collected qualitative data and finally explained it through quantitative data (Creswell, 2011, p. 543). Our study is unique and grounded in that it quantifies the qualitative data and correlates it with the self-reported anxiety scores. The implementation matrix in Figure 1 shows the phases, procedures, products, and each rationale.

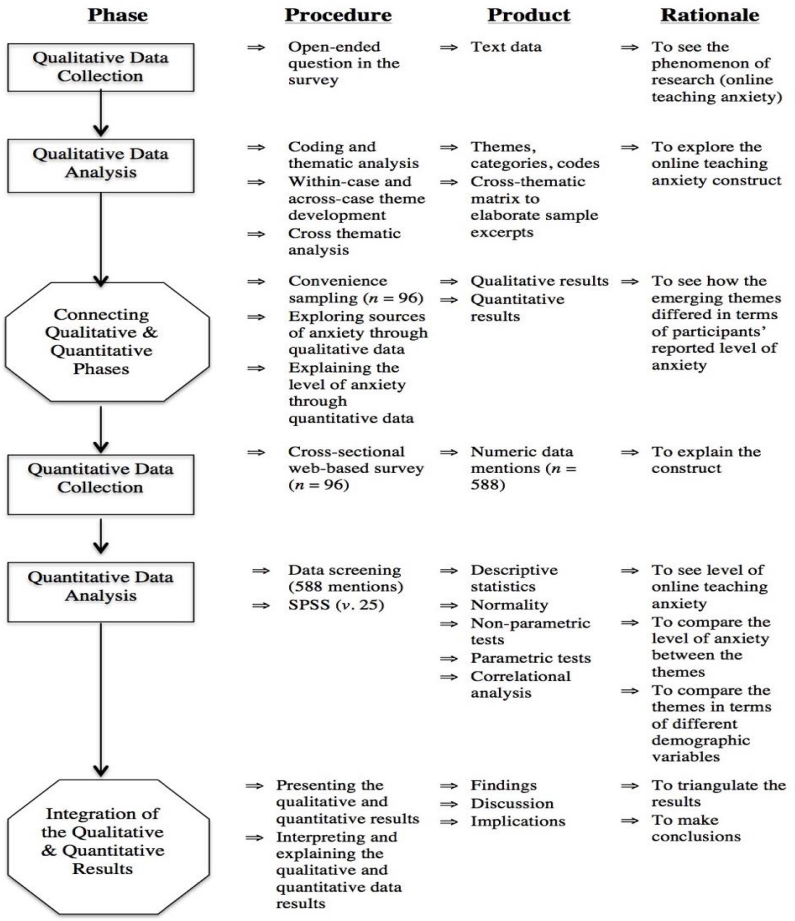

Figure 1. Implementation matrix of the design procedures.

In the sequential model, we employed open-ended questions to reveal previously unexplored themes and used close-ended questions to allow the participants to rate each anxiety source they reported. Therefore, one open-ended question and a rating closed-ended question followed each other in a sequence providing the base for the design of this study. The first research question was addressed through a qualitative research method, which explored EFL teachers' initial feelings, while the second helped us explain the level of each anxiety source through correlational statistics. Finally, the third research question investigated if the sources differed across demographic variables to triangulate the results and reveal deeper understanding of the phenomena.

2.2 Participants

The study included convenience sampling by relying on the principles of accessibility to and willingness of participants (Creswell, 2011). We prepared an online survey and shared it with 234 EFL teachers in Turkey, 96 of whom responded. This is considered highly satisfactory number in qualitative terms (Dörnyei, 2007). The teachers' average age ranged from 23 to 62 (M=35.79; SD=7.27). Sixty-seven were female (69.8%) and 29 were male (30.2%). Forty-two of them were teaching at a university while 51 at K-12 level and only three at language centre. Their average year of teaching experience was 12.46 (SD=7.35) whereas that of online teaching was 1.19 (SD=2.15), which we categorized as none (n=28), low (n=38) and high (n=30) corresponding to <1 day, <20 days and >21 days, respectively, as Table 1 displays:

Table 1

Participants' experience in online teaching

Degree of experience	*F*	*%*
None (<1 day)	28	29.16
Low (<20 days)	38	39.58
High (>21 days)	30	31.25

2.3 Data collection tools

We used an online survey on Google Forms between March 31st and April 9th 2020, to elicit teachers' sources of online teaching anxiety in the initial period of the transition to ERT in Turkey. We piloted it with five different EFL teachers and found that the survey was understood well by the participants; so we did not make any amendments and shared the survey link. We conducted the survey in Turkish to allow the participants to express their thoughts freely. In the survey, we clearly informed the participants that they take the survey with their own consent and that their anonymity would be ensured. The survey also elicited demographic information on participants' age, gender, teaching face-to-face and online experience in addition to the number of students they teach. We primarily asked the participants to share up to 10 sources of online teaching anxiety and rate the degree of each source of anxiety from 1 (very low) to 10 (very high). Their qualitative responses and quantitative ratings helped us answer the first and the second research question, respectively. This is the unique feature of this grounded research in that the participants self-identified their sources of anxiety and then self-scored each.

2.4 Data analysis

We first counted the participants' sources of online teaching anxiety and found 588 mentions. Following that, we ran an inductive analysis by coding the data,

first independently and then engaged in a simultaneous re-negotiation to establish the sub-themes to reveal the categorical information emerging from our data (Miles & Huberman, 1994; Saldaña, 2021). We iteratively coded the themes until we established a comprehensive and interconnected set of themes (Creswell, 2007). Finally, we elicited two themes with seven categories out of a total of 51 codes for the sources of online teaching anxiety. There were a number of novel categories, which may be connected with the study's specific context regarding anxiety phenomena (e.g., abrupt transition, generating online learning environments, perceiving low student interest).

As for the quantitative data, we quantified the qualitative data in order to triangulate the results. The quantified data were exposed to SPSS (v. 25) to run descriptive tests through the number and scoring of the mentions for eliciting mean and standard deviations. The data were then triangulated by comparing each theme with a set of demographic variables such as the participants' gender, age, work setting, overall teaching experience and digital teaching experience. For the triangulation, initially the normality of the dataset was calculated through tests suggested by Tabachnick and Fidell (2007): Kolmogorov Smirnov Test ($p>0.05$), Skewness (±1), Kurtosis (±1), Skewness/SE (<1.96), Kurtosis/SE (<1.96).

To be able to compare the implicated results by considering demographic variables, we calculated the normality of the dataset initially and then for each theme separately. Finally, we decided on the individual test types. Non-normal distribution was found for the whole dataset, therefore Wilcoxon Signed Test was used to see significant differences and Spearman's rho test to see correlation between the two themes. Non-parametric tests were used for 'Online pedagogy-related concerns' while parametric tests were used for 'Digitalisation-related concerns' due to the separate normality test results.

2.4.1 Triangulation of the data

Triangulation of the data has been ensured through the qualitative data from the open-ended question and the quantitative data from the participants' scoring of their responses. To triangulate the findings, firstly, the qualitative data were quantified by hand counting participants' mentions, which provided the number of each source of anxiety. Secondly, as the participants rated each source of anxiety, this provided the anxiety level for each corresponding mention. The demographic information of the participants was used as a variable for comparisons between the themes. Finally, the answers to each research question were triangulated in the findings.

2.5 Credibility and trustworthiness

The present study is drawn mostly on the qualitative data; therefore, it must be validated through scientific credibility (Creswell, 2007). It should be achieved as meticulously as in quantitative studies through concepts such as validity and

reliability (Creswell & Poth, 2016). An understanding of credibility of the data was established through informing the participants on the purpose of the study, asking participants' consent, and allowing them to withdraw at any phase of the survey; and in the findings, ensuring their anonymity in their quoted sample excerpts. We also employed debriefing technique (McMahon & Winch, 2018), firstly between researchers, and then with two outsiders experienced in qualitative analysis (Creswell, 2011; Guba & Lincoln, 2005): a researcher with Ph.D. in ELT and a professor of digitalisation in education. We provided a thick description on the research process in order to increase transferability of the findings to other similar contexts (Guba & Lincoln, 1989). The findings show that the data is objective as the phenomenon - online teaching anxiety - is evidenced through the participants' self-prompted concerns and self-rated constructs and could further be confirmed by comparing the labels emerging from the categories and the sample excerpts.

3 Findings

To address research question 1 regarding the sources of online teaching anxiety, we employed an exploratory approach in the initial stage. We identified sources of online teaching anxiety under two broad themes, digitalisation-related concerns and online pedagogy related concerns. The theme of digitalisation involves cognitive and affective aspects of information in terms of integration, availability and confidentiality (Tekerek & Tekerek, 2013) while online pedagogy covers the act of teaching senses in digital classrooms. The codes and categories show that participants touched upon their sources of anxiety related to their digital literacy and digital pedagogy concerns as they faced an unplanned transformational education abruptly. Figure 2 shows the quantified dominance.

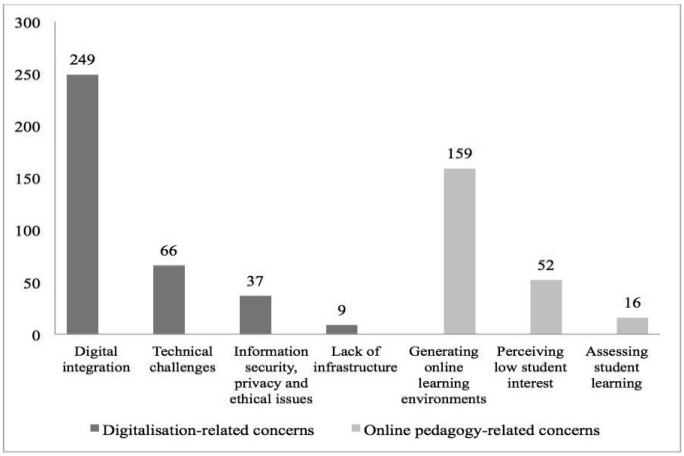

Figure 2. Categories induced under each theme.

Figure 2 shows the distribution of 588 mentions across the categories under the two main themes. The sources of anxiety show a dispersing distribution from high to low common concerns where digitalisation-related concerns (n = 361) outweigh those of online pedagogy-related concerns (n = 227). Table 2 shows the results of the inductive analysis with sample excerpts on digitalisation-related concerns below.

Table 2

Digitalisation-related concerns and sub-categories

Category	*Code*	*Sample Excerpt*
Technical Challenges	Hardware	"Again, technical problem related, speakers may not work properly so the students cannot hear the teacher or each other." (P96)
	Software	"There are some technical problems arisen from using the LMS of the university. I cannot deal with them." (P14)
	Students'facilities	"Some of my students may not have properly working devices or Internet connection that I cannot be of any help." (P28)
Lack of Infrastructure	Hardware	"I don't have the required devices." (P84)
	Software	"I don't have software programs to teach English." (P56)
Digital Integration	Assignment	"Having students do and check their homework after the online class." (P6)
	Being a multitasker	"Well, I have to manage my classes online even outside of the lesson time. I have to help them navigate the platform or add my students to the class myself. It's all time consuming." (P96)
	Communication	"Students ask me to check my e-mail box if they had uploaded their homework properly." (P83)
	Lack of knowledge	"I don't have the specific knowledge of Web 2.0 tools, so I can't produce relevant activities." (P70)
	Management of materials	"I find it difficult to create authentic materials for online courses." (P11)
	Prepararation	"I will have to do more lesson preparation." (P27)
	Professional support	"The institute did not give us any training or specify the resources we could use. There are many resources on the Internet and preparing lessons can sometimes take a long time. I think it would be better if they helped with this."(P34)
	Students' lack of knowledge	"My students don't have command over using technology." (P63)
	Transferability	"Transferring the courses planned for face to face teaching into a digital environment costs challenges." (P30)

Category	*Code*	*Sample Excerpt*
	Unpreparedness	"There are no pre-determined outputs for the curriculum compatible with the digital teaching." (P34)
	Use of modality	"I am not able to use the digital platform which makes me feel doing one-man show." (P43)
	Abruptness	"The abrupt transition to digital teaching makes me feel nervous. " (P30)
	Authenticity	"The level of emotional contact is low and it makes the things unnatural." (P73)
	Cyberharrassment	"Fear of students' sabotaging the lesson." (P13)
	Implausibility	"I don't know how effective/efficient this process is for students. But I try to support as much as I can." (P83)
	Isolation	"I think I am getting isolated from my students. (P34)
	Surveillance	"Sense of being watched triggers my camera phobia." (P51)
	Self-esteemlessness	"I don't feel secure since teacher quality is under question." (P70)
	Self-image	"I have hesitations about my appearance since I may not be photogenic enough." (P24)
	Tension	"Dissatisfaction due to the fact that I cannot run my teaching as I wish." (P45)
	Tiredness	"Even though the time for each class hour in online teaching is low, it makes me more tired." (P38)
	Trajectory	"Having the teacher, who has already taught for 20 years in f2f format forced into digital learning suddenly puts the teacher in difficulty". (P87)
Information Security, Privacy and Ethical Issues	Confidentiality	"The existence of students' parents makes me feel that I am under their control." (P72)
	Copyright	"There may be some problems related to the copyright issues of the materials we use in online teaching." (P11)
	Fear of hack	"My personal data can easily be transferred from my device in the virtual environments." (P94)

Table 2 lists the categories related to the teachers' sources of online teaching anxiety based on digitalisation, a very dominant theme closely related to their technical concerns and digital literacy skills. To illustrate, teachers have doubts which can occur beyond their control, for example possible failures stemming from issues with the Internet connection and via their delivery of communication tools such as computer devices (i.e. speakers), and similar concerns about students' own facilities. As P59 noted "the fact that some students do not have the opportunity to access to the Internet or technnological devices makes me feel anxious", there may occur problems that teachers cannot solve but cause them to be anxious about their students' learning due to external factors that they cannot

cover. Another issue is to do with the lack of infrastructure in terms of both hardware and software. The very dominant category was found with the teachers' lack of ability to integrate their teaching endeavours into the digital medium, according to their cognitive and affective perspectives. Their affective concerns ranged from the codes' abruptness to trajectioral change, and their conceptualization of their own teaching selves led to various fears that constituted their sources of online teaching anxiety. Digging in this dominant category, ample findings are revealed on digital integration-related sources of anxiety: Firstly, they need professional support from their institutions, a pre-set curriculum aligning with digital teaching requirements, the ability to select and create digitally authentic materials and to embed specific knowledge of Web 2.0 tools into remote teaching. For example, P56's statement is well-sounded evidence on that issue: "I haven't been educated to teach via digtial platforms." Secondly, they report hesitations on how to integrate themselves digitally due to their dissatisfaction, low level of emotional contact, weariness, feeling of isolation and inability to control student behaviours. Finally, some teachers seem to show resistance to change by reporting on the forced efforts to be a multitasker, due to their lack of digital teaching experience, and they do not seem to believe in the power of teaching online, where their physical existence should be felt. For instance, as illustrated by P87 who noted that "as a teacher with over 20 years of teaching experience, I am not satisfied with my teaching where I see myself as another person who deals with other things on a computer", some teachers showed resistance to the change caused by the pandemic. The last category signals that mutual trust and consent are sought among the teachers in the digital environment, because the teachers express feeling insecure about the third parties' access to their own personal data, and their online classroom confidentiality, and finally, use of digital sources. Also, the emerging categories made up of the EFL teachers' online pedagogy-related concerns, of which the inductive analysis results are shown in Table 3 below.

Table 3

Online pedagogy-related concerns and sub-categories

Category	*Code*	*Sample Excerpt*
Generating Online Learning Environments	Authority building	"I can't build authority because the class hours in f2f teaching is 50 minutes, but this is 20 minutes in digital teaching." (P28)
	Disciplining	"I can't secure discipline because some online classes are crowded." (P29)
	Boosting peer-interaction	"I can't organise the interaction among students as in my real classroom." (P59)
	Boosting	"The interaction is limited between the teacher and the

Category	*Code*	*Sample Excerpt*
	interaction	students in the course of I am teaching online." (P25)
	Patterning interaction	"The fact that I can't run pair or group activities in game formats." (P28)
	Checking comprehension	"I don't feel sure whether all the students can understand the material or the subject matters sufficiently." (P38)
	Feeling biased	"Staying in the dilemma about the way of teaching makes it hard to decide how to teach." (P38)
	Giving and receiving feedback	"I can't give and receive sufficient immediate feedback." (P88)
	Instructional talking	"Not being understood creates anxiety of inability to express myself."(P32)
	Lecturing	"I often run teaching alone and the course turns into a monologue." (P78)
	Managing time	"It must be very difficult to cope with time management in online teaching." (P6)
	Motivating	"I don't feel that I am able to energise my students and create enthusiasm." (P47)
Perceiving Low student interest	Access to students	"I find it difficult to reach students and this stresses me professionally." (P9)
	Active participation	"Students do not attend online classes constantly." (P85)
	Commitment	"There is lack of seriousness in online learning." (P92)
	Demotivation	"Students' lack of motivation demotivates me." (P95)
	Disengagement	"Students' unwillingness makes me feel upset." (P29)
Assessing Student Learning	Lack of knowledge	"I am uncertain about the examination system because I don't have an idea about which assessment and evaluation tools will be used." (P56)
	Reliability	"The idea that students get help from many people and use resources during assessment and evaluation." (P25)
	Usefulness	"A teacher has no understanding about whether all the students understood the material or not unless he conducts some evaluation test." (P38)
	Validity	"Not being able to effectively assess and evaluate the understanding of the subjects I teach is a source of anxiety for me." (P38)

Table 3 displays three categories classified under the theme on online pedagogical concerns. The predominant category is creating an online learning environment. The teachers emphasised that they may not be able to secure the

discipline and exert full control in the online classroom, a major issue also reported as to face-to-face teaching. It also seems that classroom management becomes more challenging in online teaching due partly to the inability to activate students through building interaction between their peers in pair or group activities and also with themselves. For example, as P25 expressed "the idea that I cannot let students interact with me and each other in pair-work and group-work activities authentically in online education triggers my anxiety", teachers see remote education lacking authenticity in terms of real-time interaction. In addition, the teachers are not sure whether students are actively involved in learning during online courses; their anxiety seems to stem from their inability to make students verbally active, to pass on relevant feedback, and develop a sense of teaching adequately. The second pedagogical concern is related to their perceptions of students' inadequate attempts and efforts to adapt to the online learning setting, which in turn seems to impact on the teachers' motivation, increasing nervousness and tension, as they cannot create sufficient student enthusiasm. In this regard it is paramount of significance to see P65's statement: "Students are not sufficiently active in online education though I do my best to get them involved but this causes me to feel in a way that I am and will not be able to create enthusiasm and energy required for a real teaching." because P65' statement reached in several codes such as generating online learning and students' lack of interest and this eventually shows EFL teachers' concern for being pedagogically equipped for teaching online. The last category is assessing student learning, in that teachers feel lack of experience to ensure fair testing and evaluation of student learning in online environments.
The research question 2 revealed the extent to which these sources influenced their online teaching anxiety. Table 4 compares this influence between the induced themes below.

Table 4

Wilcoxon signed ranks test results for comparing digitalisation and online pedagogical concerns

Themes	*Positive Ranks*	*Negative Rank*	*Ties*	*Z*	*p*
Digitalisation- and Online Pedagogy-Related Concerns	51	43	2	-0.5	0.617

Table 4 shows that no statistically significant difference was found between the two main themes although digitalisation-related concerns were mentioned more frequently than those related to online-pedagogy. Table 5 displays the degree of correlation.

Table 5

Spearman's rho test results

Themes	*r*	*p*
Digitalisation- and Online Pedagogy-Related Concerns	0.024	0.814

According to the correlation results shown in Table 5, no statistical significance difference and correlation was found between the two themes (r=0.024; p=0.814). The most cited anxiety sources did not necessarily imply that these concerns led to anxiety among all participants in the same way. Therefore, these two themes do not have a causal relationship.

The collected data are jointly triangulated by presenting the number of mentions (f) as to each category and participants' scoring of each category from 1 (very low) to 10 (very high). Table 6 shows the triangulated results of the first theme.

Table 6

Descriptive test results of digitalisation-related concerns

	Anxiety Mention	*Anxiety Score*	
Category	*f*	*Mean*	*SD*
Digital integration	249	7.36	2.07
Technical challenges	66	6.90	2.20
Information security, privacy and ethical issues	37	6.30	2.30
Lack of infrastructure	9	7.77	2.09
Total	361	7.18	2.14

The teachers produced a total number of 361 mentions in which they dominantly felt the need to get digitally integrated (f=249) with the most common ideas (SD=2.07) but scored it with the second highest degree (M=7.36) after their hesitations about the information security and their confidentiality (M=7.77; SD=2.09). According to the qualitative findings on Table 2, the participants specifically noted their lack of ability to integrate their teaching endeavours into the digital medium according to their cognitive and affective perspectives. The conceptualisation of their own teaching revealed various fears that attract particular attention on their need for professional support from their institutions on how to be digitally integrated in terms of following a suitable curriculum and being able to digitally skilful, secure and safe. The category of 'Information security, privacy and ethical issues' shows this with a relatively low number of mentions (f=37) but as noted before with a high level of anxiety source (M=7.77; SD=2.09). They also mentioned the technical challenges (f=66) with a relatively more concerns; however, they rated it with a mean score of 6.90, not in the form of dispersed views (SD=2.20). Closely related to this category, nine

concerns emerged about the 'lack of infrastructure' in both 'hardware' and 'software' related challenges with a mean score of 6.30 (SD=2.30). It was a concern linked to both low number of mentions and degree of anxiety.
Therefore, the participants' sources of anxiety are dominantly interrelated with their computer interactions, yet the results also shed light on pedagogical behaviours, which is a fairly new trend in covering teaching senses in ERT. Table 7 displays the descriptive results on the reported number and scoring of online pedagogy-related concerns.

Table 7

Descriptive test results of online pedagogy-related concerns

	Anxiety Mention	*Anxiety Score*	
Category	*f*	*Mean*	*SD*
Generating online learning environments	159	7.27	2.01
Perceiving low student interest	52	6.94	2.15
Assessing student learning	16	7.93	1.29
Total	227	7.24	2.01

Table 7 shows that the participants generated 227 statements with three emerging categories. 159 mentions highlighted the lack of abilities to 'generate online learning environments' about which they felt high level of anxiety (M=7.27, SD=2.01). According to the qualitative data results (see Table 3), the EFL teachers touched upon issues about authority building, classroom management and empowering learners with interaction-based activities. Particularly, most of their anxiety seems to stem from their inability to develop a sense of teaching that they experienced. Secondly, the analysis revealed 'perceiving low student interest' (f=52). Teachers noted students' inadequate attempts and efforts to adapt to the online learning setting. They scored this sense with a high degree of anxiety (M=6.94, SD=2.15) though this is the lowest degree in comparison to other categories. The last category emerged as 'assessing student learning' with the lowest common concern (f=16) but caused the highest source of anxiety (M=7.93, SD=1.29) among others. However, though EFL teachers scored it at a greater extent than of generating online learning environments, this category has a mutual relationship with 'generating online learning environments' because once the latter is ensured then assessment may become achievable. In sum, Table 7 provides the extent to which EFL teachers scored their anxiety sources, but which require further tests to be validated across several demographic variables of the participants.
We employed further tests in line with Dörnyei's (2007) argument that statistical significance tests are valuable to processing the quantified qualitative data. The

demographic data allowed us to make further statistical analyses. Research question 3 tested scorings of sources of anxiety in terms of different variables with the appropriate parametric and non-parametric tests fitting to the normality test results (See section 2.4 Data analysis).

Table 8

Parametric and non-parametric test results according to different variables and groups

			Digitalisation (Parametric tests)					*Online Pedagogy (Non-Parametric tests)*			
Variable	Group	*n*	Analysis	*M*	*SD*	*t*	*p*	Analysis	*Med*	*Z*	*p*
Gender	Male	29	Independent	.69	.48	-0.315	0.75	Mann-Whitney U Test	48.31	-0.044	0.965
	Female	67	Samples	.73	.45				48.58		
	Total	96	*t* test	.72	.46						
Age	<=30	23	Oneway Anova	.71	.45	0.367	0.777	Kruskall Wallis	53.46	4.097	0.251
	31-40	51		.71	.45				43.25		
	41-50	19		.77	.52				54.61		
	>50	3		.48	.13				61.17		
	Total	96		.72	.46						
Overall teaching experience	<=5	19	Oneway Anova	.78	.51	0.147	0.964	Kruskall Wallis	40.00	3.949	0.413
	6-10	21		.68	.44				55.36		
	11-15	27		.72	.45				45.20		
	16-20	19		.68	.45				51.89		
	>=21	10		.73	.49				52.70		
	Total	96		.72	.46						
Digital experience	None	28	Oneway Anova	.71	.50	3.783	0.026*	Kruskall Wallis	41.91	2.465	0.292
	Low	38		.85	.42				52.68		
	High	30		.55	.42				49.35		
	Total	96		.72	.46						
Work Setting	University	42	Oneway Anova	.73	.50	1.215	0.31	Kruskall Wallis	52.18	2.968	0.563
	Lg. Center	3		1.26	.94				34.83		
	High Sch.	18		.69	.29				41.28		
	Secondary	18		.65	.40				46.67		
	Primary	15		.67	.46				51.80		
	Total	96		.72	.46						

*p< .05

Table 8 shows the results of significance tests for comparisons of themes and different variables: participants' gender, age, overall teaching experience, digital teaching experience, and work setting (i.e., K12 level or tertiary level). However, the only statistically significant difference was found between low and high online teaching experience (p=0.026), meaning low experience might trigger more anxiety in online teaching.

Tabulating the data both from the quantitative and the qualitative research methods, the results indicate that teachers' sources of anxiety fall at the intersection of digitalisation- and online pedagogy-related concerns with high levels of anxiety. This means teachers felt anxious in ERT due to the lack of their affective and cognitive competences to tailor the integration into the new modality, their access to the available information and lastly their safety in terms

of the confidentiality of the information. Therefore, these findings imply the need for developing knowledgeable teachers who can develop computer interactions by acting on professional behaviours accordingly. Further, as evidenced particularly with the statistically significant difference tests, participants with low level of experience in online teaching have high level of digitalisation-related anxiety.

4 Discussion

In this study, we focused on an underexplored topic in the literature; namely, teaching anxiety in online education (Bollinger, 2017; Russell, 2020). The aim was three-fold: to explore the sources of online teaching anxiety (I), explain the extent to which each source contributed to teachers' anxiety (II) and see whether the level of anxiety differed statistically significantly across demographic variables (III).

The findings of research question 1 showed that after Covid-19, the teachers' sources of anxiety relied on digital and online pedagogical competences in the new modality. The first theme emerged as "Digitalisation-related concerns" covering 'technical challenges', 'lack of infrastructure', 'digital integration' and 'information security, privacy and ethical issues' which are also documented to lead to stress and anxiety among teachers by Çoklar et al. (2016), Picciano et al. (2012), Hassan et al. (2019), and Russell (2020). Specifically, 'lack of infrastructure' might be seen as a challenge in developing countries including Turkey; however, the other categories could be related to the teachers' digital literacy since hesitations occurred on technical skills, digital knowledge, creating digital content and digital security. Also, teachers' digitalisation concerns could be linked to emerging digital citizenships through digital competences as categorized by Janssen et al. (2013): information, communication, content-creation, safety, and problem-solving. The participants may have had technology knowledge and awareness but their concerns signal their need for digital literacy, which involves mastery of ideas in not only using but also integrating the technology into online pedagogical practices (Tang & Chaw, 2016, p. 56).

The second theme included concerns related to 'generating online learning environments', 'perceiving low student interest' and 'assessing student learning'. These findings bring unique and specific concerns to be addressed. For example, some participants reported hesitation in how to ensure quality teaching, manage classroom, enhance interaction and build authority, increase motivation and deal with time management. Our participants also highlighted students' reluctance to engage with online learning during ERT (Baloran, 2020), but this is contradicted by Lazarevic and Bentz (2020), who argue using technology reduces stress in online environments compared to the traditional classroom. However, our study shows that the themes we induced appeared to be linked with teachers' inadequate competences to build online pedagogical designs and practices. This shows similarity to the findings of Sahu (2020) in

that lack of digital pedagogy could also lead them to feel anxious in assessing students' learning. Additionally, as reported by Wolgast, Hille, Streit and Grützemann (2020), if anxiety is felt emotionally (e.g. in tests), it could afford more opportunities for student teachers to increase perspective-taking tendency. Therefore, some level of anxiety could bring affordances for teachers to develop professional learning in the journey of professional teaching.

The findings of research question 2 showed that the reported sources of anxiety scored by the same participants allowed us to explain how these sources might have contributed to the degree of anxiety about online teaching. The analysis showed neither significant difference nor correlation between the two emerging themes. Recently, in their examination of news media publications after Covid-19, Greenhow, Lewin and Staudt Willet (2020) found digital pedagogy as a dominant category among the reported challenges by teachers. However, our study findings made a distinction between the digitalisation and online pedagogy with the dominance of the former to the latter theme. The results showed that lowest scorings were attributed to technical challenges and safety. This shows evidence from the literature that teachers with higher confidence with technology use (particularly internet use) may have tended to score low anxiety because they show traits of higher level of digital literacy (Serafín, Depešová, & Bánesz, 2019). In addition, another striking finding was teachers' perception of low level of student interest. Though it was the second highest category under digital pedagogy concerns, participants scored it with the lowest degrees of anxiety. This could be related to learners' low level of readiness as also reported by Brinkley-Etzkorn (2020).

The findings of research question 3 indicated that teachers with low levels of experience showed higher anxiety in digitalisation-related concerns than those with higher levels of experience. Our participants had an average of 12 years of teaching experience but only 31% reported substantial online teaching experience in their professional career. In the pertinent literature, there is evidence that the negative impact of anxiety is higher relatively among novice teachers than experienced teachers (Fernández-Batanero et al., 2021; Hassan et al., 2019). On the other hand, digital competence could be nurtured and cultivated over time as challenges are experienced and adapted (Ghomi & Redecker, 2018). Since anxiety may be a state or a trait anxiety, the state anxiety fades away after the conditions caused it; therefore, there is a further need to investigate the same participants' anxiety levels in order to see whether it is a trait anxiety being persistent in their psychological status.

Conclusion

We can conclude that the participants' lack of digital literacy and experience might have caused them to feel anxious about the unknown and inexperienced challenges that can be encountered during ERT. The findings obtained from this study cast evidence on the need for digitally literate and pedagogically

transformed teachers. Therefore, we can emphasize the link between anxiety and lack of digital literacy because teachers who self-reported higher digital literacy appeared to score less anxiety about integrating digital resources into pedagogical practices. Yet the findings showed, teachers still attribute their sources of anxiety to the technical and infrastructural challenges, which appeared to trigger anxiety particularly among teachers with relatively less experience in online teaching.

It is significant to note that Turkish Ministry of Education already initiated a nationwide digitalisation project in cooperation with Google to address the multiple challenges, representing the recognition of the need for digitally literate teachers before the outbreak of the Covid-19 (Ministry of National Education, 2019). However, with the present study, we conclude that teachers need to shift their attributions of anxiety to their own digital literacy and to improve the use and integration of digital tools and facilities for multiple pedagogical purposes.

The qualitative findings can be representative of the unprecedented experience of Covid-19 in Turkey because the number of participants was strongly satisfactory according to Dörnyei (2007). On the other hand, an online/remote teaching anxiety scale can be developed out of the qualitative excerpts and categories, therefore, larger sampling sizes of quantitative data might measure the level and degree of anxiety better not only in Turkish but also in other contexts in the future.

Suggestions

In such an ERT transition as witnessed during the Covid-19 pandemic, it is unsurprisingly challenging to create an environment conducive to teacher adaptation to the new course delivery mode. Many studies suggest that training could help reduce anxiety (Fernández-Batanero et al., 2021; Hassan et al., 2019; Russell, 2020) but in this case there was little time or resources to enable these support forms. Therefore, we suggest three main areas of support to facilitate teaching and to address teachers' anxiety on teaching remotely. The first is to officially reduce the teaching load to increase the lesson preparation time and enhance the quality of remote teaching. The second area of support is to offer very short but focused training sessions which give clear hands-on and practical knowledge about how to use the remote teaching platforms to plan courses and engage students, how to make lessons more interactive, and thus, more motivating. The third area is to train teachers on how to offer continuous feedback to further strengthen interaction with learners and support learning.

We propose that we need to develop dynamically active digitalisation programs for teachers and learners who are experiencing a dramatic emotional and cognitive conflict. This is a problem that requires a systematic attention to developing alternatives for overcoming the consequences of this unique global situation, with a view to developing a person in-context perspective. By doing so, there should be opportunities for any emergency situational developed,

context-appropriate online pedagogies drawn up on well-established pedagogical principles. This could be created through critical interpretations of theory-informed local implementations and understandings.

Implications

There are a number of implications for teachers, teacher educators and educational decision-makers that play a key role in such circumstances. Teachers need to self-identify their anxiety sources and develop local strategies to remain resilient in the face of challenges. They should autonomously develop new ways of interactions with more experienced colleagues to learn from one another and also self-train their skills in online platforms.

Teacher educators and higher education curriculum designers need to reconsider how they could educate teachers for such emergency circumstances, which could reduce the anxiety and its negative effects on teaching. Although faculties offer courses focusing on technology use, teacher educators need to incorporate actual remote teaching experiences by engaging students in online courses, increasing motivation and designing collaborative tasks.

Educational policy makers might need to systematically activate emergency plans to keep teachers in readiness to overcome the challenges of remote teaching. The gradual, but profound and perhaps irreversible nature of educational transformation will also shift the existing mindset of teachers and learners from place-based to online and blended pedagogies supported by hybrid models of learning. These approaches could include how to work with multimodal resources, digital or printed, online or physically present teacher, synchronous or asynchronous interaction, and the consumption or creation of digital media for learning. The teacher education curricula also need to re-situate the learning objectives, outcomes, and outputs in such a way so as to address the online learning experiences and facilities. The learning offered in the classroom will become obsolete unless improvised with alternative models involving a multimodal digital approach to teaching.

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What are Turkish Preservice Science Teachers' Claims about Daily Life-Threatening Situations?

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Abstract:
Introduction: Science courses involve a wide range of content. The benefits of science education become clear when science is applied to daily life because science has the capability of raising the quality of life by eliminating a variety of problems. Accordingly, as technological advances are made, daily life applications are frequently refreshed and improved. Though such improvements aim to make contributions to human life, many points still need to be considered carefully. In this study, we wanted to address this issue from the perspective of preservice science teachers. The target of the present study therefore is to investigate the claims of preservice science teachers about daily life-threatening situations which can be explained within the scope of their scientific knowledge of physics, chemistry and biology. Thus, the study will introduce examples given by preservice teachers regarding everyday situations that endanger daily life, along with their reasons for providing these examples. It will also be possible in this way to determine situations that were not mentioned by the participants.
Methods: A qualitative study was conducted with a total of 153 third-year preservice science teachers studying in three different state universities in western Turkey. Data were collected with the help of a questionnaire consisting of three open-ended questions. Content analysis was utilized in the data analysis. The analysis results yielded themes and categories that the participants identified as daily life-threatening situations. An analysis was also made of why the participants chose to offer these particular examples.
Results: According to the results, the most common daily life-threatening situations identified by the participants were electric shock (68.6%), which fell within the scope of their physics knowledge; not taking safety precautions while working with chemicals (74.5%), falling within the scope of their chemistry knowledge; and damaging nature (33.3%), which

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fell within the scope of their biology knowledge. The participants generally referred to health and environmental problems as the reasons leading them to provide their examples.
Discussion: The study focused on the association of scientific knowledge with daily life, which is one of the aims of science education. The results indicated that preservice teachers associated their scientific knowledge with daily life-threatening situations at various levels. Also, the reasons they offered made connections with various health and environmental issues. In addition to the examples provided by the participants, several situations were seen to be ignored. Additionally, and in line with the literature, a few misconceptions were encountered in their explanations.
Limitations: The present study was limited to the findings obtained from three state universities in Turkey. Similar investigations might be conducted in different countries so that further comparisons may be made possible in this context.
Conclusion: To conclude, preservice science teachers were aware of various health and environmental issues with respect to the examples they offered. However, there were also gaps in their associations between scientific knowledge and daily life. The findings obtained from the present study might be used to design the content of courses (such as Environmental Science or Science Teaching Laboratory Practice) given in faculties of education, and to raise awareness among preservice teachers in this context.

Key words: science-daily life associations, scientific knowledge, preservice science teachers.

Introduction

Throughout history, the field of science education has provided various concepts for researchers to explore. One of these is scientific literacy (Deboer, 2000). As a result of scholarly discussions, Roth and Lee (2004) have indicated three assumptions related to this term: a) scientific literacy is an attribute of individuals; b) science is the paradigmatic mode for rational human conduct; and c) knowledge learned in school is transportable to life after school. One of the goals of science education is to teach and learn science that has a direct application to everyday living (Deboer, 2000). Accordingly, another term discussed in the field is science-technology-society (STS), which highlights connections to real life. Mansour (2009) indicates that teaching science within the STS paradigm is derived from both students and teachers working together cooperatively or from suggestions offered by students based on their interests and the life issues confronting them. Thus, various situations that exist in daily life are emphasized in the context of teaching science.

The benefits of science education become clear when it is applied to daily life because science raises the quality of life by eliminating a variety of problems.

However, daily life activities might also lead to negative influences on human beings. Hence, individuals should possess awareness about possible dangers. This awareness is believed to be strongly connected to having sufficient scientific knowledge.

Unfortunately, science education is said to be in crisis (Chowdhury, 2013). Tytler (2007) explains four main aspects of this:

a) the evidence that students develop increasingly negative attitudes to science over the course of their secondary school years;
b) decreasing participation in post-compulsory science subjects, especially the "enabling" sciences of physics and chemistry, and higher mathematics;
c) a shortage of science-qualified people in the skilled workforce;
d) a shortage of qualified science teachers.

As can be seen above, one part of this negative situation related to science education has been attributed to science teachers. In this paper, we address elementary school science teachers. It might be stated that preservice science teachers are trained to teach the subjects of biology, chemistry and physics to middle school students. Their contribution to young students' attitudes and interests towards science is significant for this reason. However, Talanquer (2013) asserts that all prospective secondary school teachers and high school chemistry teachers do not recognize underlying themes and meaningful connections beyond content. Yet young students need to be taught science by considering underlying meanings. Researchers, policy makers and educators believe teachers to be important school-related influencers (Geršicová & Barnová, 2018). Thus, preservice teachers' perceptions towards connecting concepts to everyday life with science are important in shaping the future of science education since this clearly will have an effect on the future of society.

There have been a number of learning theories in the literature that have not been fully successful in explaining and resolving issues related to learning due to the complex nature of human behavior and the differences between human beings (Mercan, Gürlen & Köseoğlu, 2019). Recently, attempts have been made to overcome problems related to science education with the help of context-based approaches where theoretical knowledge is closely related to daily life occurrences and events in contrast to rote learning. Context-based approaches are most frequently encountered in chemistry education (King, Bellocchi, & Ritchie, 2008; Mandler, Mamlok-Naaman, Blonder, Yayon, & Hofstein, 2012). In this kind of approach, the level of association between students' knowledge and daily life events is seen to be an indicator of the extent to which the education provided departs from rote learning (Cengiz & Ayvacı, 2017). Science education is meaningful when students can translate their learning to their lives. Çepni, Ülger, and Ormancı (2017) express their view that associating science with daily life provides a meaningful learning of science concepts and the ability to use this knowledge in situations or problems that students encounter. The researchers determined that prospective science teachers believe that teachers

play the most important role in helping students connect scientific knowledge with their everyday lives.

1 Literature review

In the literature, many works of research deal with the way students associate their scientific knowledge with daily life. Some address the issues of younger students. In their study, Taşdemir and Demirbaş (2010) investigated the ability of sixth- and seventh-grade students to utilize their scientific knowledge in solving the problems they encountered during their daily lives. Their results indicated that students mostly experienced difficulty in the unit related to matter whereas they were more successful in units related to light and sound. Brkich (2014) researched how fifth-grade students connected their real-life experiences with the content in earth science. The results showed that they were able to make direct observations of the content and made analogies when direct observations were not possible. Also, Cengiz and Ayvacı (2017) examined fifth-grade students' level of associating daily life events with the subject of changes of state. Their study revealed students' levels of partial understanding and misunderstanding.

There are several articles that deal with high school students in this context. In their study, Demircioğlu, Demircioğlu, Ayas and Kongur (2012) investigated levels of theoretical knowledge and application among tenth-grade students. The results implied that students were significantly more successful in terms of theoretical knowledge but also possessed insufficient understanding and misconceptions. In another study, Çimer (2012) identified one of the reasons that high school students experienced difficulty in learning biology was the fact that the topics covered in the courses were not associated with daily life.

It can be seen that there is more research conducted with university students studying in the faculties of education. This might be explained by the fact that it will be these students who will be taking on the role of teaching the students of the future about the associations between science and everyday life. In their study, Balkan-Kıyıcı and Aydoğdu (2011) reported that senior science teaching students connected their physics knowledge with everyday life at the highest level and that they formed associations to a lesser degree using their knowledge of chemistry and biology. In another study, Çepni et al. (2017) found that nearly all of the second-, third- and fourth-year science teaching students agreed on the importance of making a connection between scientific knowledge and everyday life. Also, Uğraş, Aydemir, and Asiltürk (2017) determined that senior science teaching students were more equipped with the scientific views that permitted them to connect their chemistry knowledge to daily life. Additionally, their attitudes towards teaching science showed a strong and statistically significant correlation with their association levels. At the same time, Yadigaroğlu, Demircioğlu, and Demircioğlu (2017) detected various problems related to the

association of chemistry knowledge with daily life as well as various misconceptions among junior science teaching students.
The literature mentioned above pointed to several problems in the associations between scientific knowledge and everyday life made by students in different grades. On the other hand, context-based studies showed gains in learning (Demircioğlu, Demircioğlu, & Çalık, 2009; Elmas & Geban, 2016), learning retention (Demircioğlu et al., 2009; Kutu & Sözbilir, 2011), and motivation (Kutu & Sözbilir, 2011) among students.

2 The rationale for the study

As mentioned earlier, decreasing interest and attitudes of the students towards science makes it imperative for educators to find ways of getting students involved in their courses. Science courses involve a wide range of content that can be applied to daily life and these applications are frequently refreshed with technological improvements. Though those improvements aim to make contributions to human life, various points need to be considered carefully in this context. In this study we wanted to address this situation from the perspective of preservice science teachers. The present study thus targets the investigation of the claims of preservice science teachers about daily life-threatening situations that can be explained in the context of their scientific knowledge (physics, chemistry and biology knowledge). Thus, the study will introduce examples given by preservice teachers regarding situations that endanger daily life, along with their reasons for choosing these cases. It will also be possible in this way to determine situations that were not mentioned by the participants.
It is thought that preservice science teachers should fully consider daily life-threatening situations since they who will be the educators of young children in the future. The importance of preservice science teachers' association of scientific knowledge with daily life was also highlighted by Balkan-Kıyıcı and Aydoğdu (2011). A strong significant relationship was reported as well between preservice teachers' association of chemistry knowledge and science teaching attitudes (Uğraş et al., 2017). Unfortunately, the literature also indicated problems in students' association of scientific knowledge with daily life. The results of the present study are expected to make contributions to the field of science education in the context of the three branches of physics, chemistry and biology in order to make it possible to shape the contents of context-based science courses.
The research questions were as follows:
What were the Turkish preservice science teachers' examples and why did they choose these cases related to the daily life-threatening situations which they could explain within the scope of their:

- Physics knowledge?
- Chemistry knowledge?

- Biology knowledge?

3 Method

3.1 Study design

The present study explored preservice science teachers' claims about daily life-threatening situations that could be explained with scientific knowledge. In line with this aim, a qualitative approach was employed in the study. Qualitative research aims to provide detailed descriptions and interpretations and to comprehend the perspectives of the actors involved (Yıldırım & Şimşek, 2016). Action research was thus conducted to learn what issues were related to the application of scientific knowledge in daily life. So, the intention of the study was to interpret the participants' perspectives from their reasons.

3.2 Study group

The study was conducted with the voluntary attendance of 153 preservice teachers studying in the science teaching programs of education faculties at three state universities located in the western part of Turkey. All of the participants were third-year students enrolled in four-year science teaching programs. The average age of the participants was 21. Eighty-eight (57.5%) were female while 65 (42.5%) were male students. Table 1 provides frequency and percentage distributions of the participants with respect to the university and gender factors.

Table 1

Participants' distribution with respect to university and gender

	Female	*Male*	*Total*
University 1	29 (19.0%)	20 (13.1%)	49 (32.0%)
University 2	27 (17.6%)	23 (15.0%)	50 (32.7%)
University 3	32 (20.9%)	22 (14.4%)	54 (35.3%)
Total	88 (57.5%)	65 (42.5%)	153 (100.0%)

The study group was formed via the purposeful sampling method. This method is based on selecting information-rich cases coinciding with the main aim of the study (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2010). Criterion-based sampling, a type of purposeful sampling, was considered in the present study. Criterion-based sampling focuses on the examination of cases that meet several previously-determined criteria (Yıldırım & Şimşek, 2016). These criteria are reported to be determined by the researchers or they might be based on a checklist. In this study, two criteria were considered in the formation of the study group by the researchers. Firstly, the participants were thought to be competent in the science branches of physics, chemistry and biology since they were taking related courses during their university education. Accordingly, the study investigates cases related to all of these three branches. Secondly, the

participants were expected to be able to make reasonable claims in their third year because they had taken most of their field and field education courses by this time. The criticism might be made that their final year would have been more appropriate for this application, but graduation stress factors (business concerns, career decisions, etc.) are believed to be obstacles in obtaining fruitful responses in data gathering. The study was therefore designed in the structure described above.

3.3 Data gathering instrument

Data were collected with the help of an instrument consisting of three open-ended questions developed by the researchers. Open-ended questions allow researchers to handle the study subject in a flexible and open-ended manner (Yıldırım & Şimşek, 2016). In each question, the students were asked to provide dangerous situation(s) that were encountered in daily life that involved physics, chemistry or biology. In addition, they were asked to provide explanations by giving reasons that would clarify their decision to choose the examples they gave. The students were asked to offer as many examples as they could, accompanied by reasonable explanations. The responses of the participants constituted the data of the study.

3.4 Data analysis

Data were analyzed with the help of the qualitative method of content analysis. The responses of the students for each branch were examined by the researchers in detail. In this process, codes were defined by the researchers which were derived from the study data (Hsieh & Shannon, 2005). The procedure followed in the study analysis is demonstrated in Figure 1:

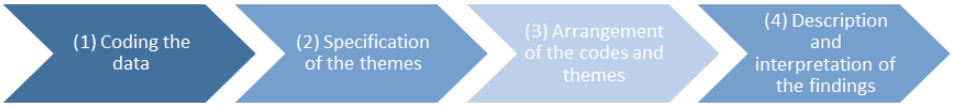

Figure 1. Steps of data analysis in qualitative research (Yıldırım & Şimşek, 2016).

The participants' examples related to daily life-threatening situations were coded and classified in a meaningful manner. Afterwards, those codes were gathered under sub-categories and categories. Next, the categories were collected under main categories called themes (Çelik, Başer Baykal, & Kılıç Memur, 2020). The same procedure was also conducted for the participants' explanations. The findings were tabulated to show the relative percentages of the categories.

Both researchers worked on the study data. They went on to identify the points they agreed and disagreed could be included in the same category. The reliability of data analysis was checked with the formula suggested by Miles and

Huberman (1994). The calculation result indicates the reliability of data analysis when interrater consistency exceeds 70% (Yıldırım & Şimşek, 2016). After conducting careful discussions, the interrater consistencies were calculated to be 92.0% for the preservice teachers' examples and 95.0% for their reasons.
In the results of the analysis, several parts were marked with "*" which indicated misconceptions. At the same time, several preservice teachers were found to state irrelevant responses. Such responses were not presented in the tables but explained in the findings.

4 Findings

The findings of the study are presented in three sections that deal with physics, chemistry and biology.

4.1 Findings in the context of physics

Table 2 presents the preservice science teachers' examples and the reasons they offered for presenting the daily life-threatening situations that can be explained within the scope of physics knowledge.

Table 2

The Turkish preservice teachers' claims about daily life-threatening situations within the scope of physics knowledge

Themes	*Categories*	*%*	*Because it might cause…*	*%*
Electricity	Electric shock	68.6	Deaths and injuries	68.6
	Problems with electrical items	17.6	Items breaking down	9.8
			Fires	3.9
			Injuries	3.9
Friction	Not using winter tires in cars during the winter	5.9	Traffic accidents due to less friction because of ice*	5.9
	Type of floor or ground surface	3.9	Injuries as the floor or ground becomes slippery, especially in winter	3.9
	Wearing leather-soled shoes in winter	1.9	Skidding and falling due to less friction because of the smaller surface areas of leather-soled shoes*	1.9
Motion-Energy	Falling of pulleys at construction sites	5.9	Injuries	9.8
	Squeezing an elastic spring and releasing it	1.9		
	Getting a hand caught in a spinning wheel or rotor	1.9		
Optics	Use of the wrong type	3.9	Harm to eyes	3.9

	of eyeglasses			
	Leaving broken pieces of glass in the forest	3.9	Fires	3.9
	Not using concave mirrors along the bends in the road	1.9	Traffic accidents	1.9
Radiation	Radioactive beams	3.9	Mutations	1.9
			Bodily harm	1.9
	Watching an eclipse with the naked eye	1.9	Blindness	1.9
	Taking X-rays of pregnant women	1.9	Maternal and fetal harm	1.9
	Overuse of cell phones	1.9	Bodily harm due to electromagnetic waves	1.9
Heat and Temperature	Touching a lit light bulb for a long time	1.9	Hand injuries	1.9
	Being careless when lighting candles	1.9	Fires	1.9
	Not keeping hair away from face when experimenting with fire	1.9	Hair catching fire	1.9
Pressure	Shaking a carbonated drink bottle before opening the cap	1.9	Injuries due to the bursting cap under the effect of pressure	1.9
Speed	Fast driving	1.9	Traffic accidents, death and loss of property	1.9
Sound	Exposure to loud sounds	1.9	Harm on ears due to ultrasound*	1.9
Others	Buildings lacking earthquake inspection	1.9	Collapsing buildings, deaths, loss of property	1.9

According to Table 2, the participants' daily life-threatening situations were mostly associated with electricity as related to their physics knowledge. The findings showed that several participants provided explanations that contradicted scientific notions. For example, 12.4% of the preservice teachers who gave the example of electric shock (68.6%) stated that changing light bulbs while the switch was open was hazardous. Also, 1.9% of preservice teachers thought loud sounds were the same as ultrasound. Similarly, 1.9% thought that friction depended on surface area. These explanations indicated misconceptions. Additionally, several reasons (5.9%) were given regarding the term, "friction," which they said decreased with ice instead of referring to the friction coefficient or frictional force. Also, several participants offered irrelevant responses: touching electric wires (3.9%), cultivating soil on sloping land (1.9%), friction experiments (1.9%), expansion of wires in summer (1.9%), and plugging in electrical appliances (1.9%).

Table 3 shows details from the participants' responses related to the theme of electricity which is the most dominant theme in physics.

Table 3

Details related to the categories of the theme electricity

Theme	*Categories*	*Sub-categories*	*%*
Electricity	Electric Shock	- Touching a switch with wet hands	15.7
		- Changing light bulbs without taking precautions	12.4
		- Standing under a tree when there is lightning and thunder	8.5
		- Not using lightning rods in tall buildings	8.5
		- Using electrical items with damaged wires	8.5
		- Using switches without a covering	8.5
		- Inserting conductors into the switch	6.5
	Problems with Electrical Items	- Leaky electrical devices	5.9
		- Electrical devices with short circuits	5.2
		- Overheating of electrical appliances left plugged in too long	3.3
		- Electrical devices exposed to high voltage	3.3

The reasons preservice teachers offered in the context of physics-related cases were mostly associated with the harm to human health, such as deaths and injuries. Also, fires, traffic accidents, loss of property were other reasons behind the examples they provided.

4.2 Findings about chemistry

Table 4 presents the preservice science teachers' examples of life-threatening situations in everyday life in the context of their chemistry knowledge and the reasons they provided these examples.

Table 4

Turkish preservice teachers' claims regarding daily life-threatening situations in the context of chemistry knowledge

Themes	*Categories*	*%*	*Because it might cause…*	*%*
Chemicals	Not taking safety precautions while working with chemicals at home, in the lab or outside	74.5	Health problems/deaths	43.1
			Physical damage when gloves, masks or coats are not worn.	23.5
			Explosions/fires	3.9
			Loss of property	3.9
	Breathing hazardous chemicals	23.5	Harms on health/lungs	19.6
			Poisoning	3.9

	Mixing chemicals	19.6	Deaths and organ failure	15.7
			Explosions and hazardous gas release	3.9
	Using chemicals with unknown ingredients	17.6	Side effects/allergies/harms	15.7
			Collapsing immune system	1.9
	Excessive use of chemicals	11.8	Health problems	5.9
			Environmental pollution and soil inefficiency	3.9
			Poisoning	1.9
	Drinking chemicals by mistake	7.8	Deaths	3.9
			Poisoning	3.9
	Chemicals not rinsed sufficiently	3.9	Harm to skin	1.9
			Residue that can lead to poisoning	1.9
Environment	Using plastic bags unnecessarily	3.9	Environmental pollution	3.9
	Throwing away used batteries	3.9	Environmental pollution	3.9
	Mixing of drinking water with heavy metals	1.9	Poisoning	1.9
	Not using filters in factory chimneys	1.9	Air pollution	1.9
	Draining factory wastes into the sea	1.9	Water pollution and harm to living things	1.9
	Radiation	1.9	Diseases	1.9
	CO poisoning	1.9	Unconsciousness/death	1.9
	Acid rain	1.9	Irritations on body	1.9
Other	A rusty nail piercing the foot	1.9	Health problems	1.9

Table 4 summarizes the preservice science teachers' claims under two themes in the context of chemistry as well as the case of a rusty nail piercing the foot that is shown under "Other." Details of the cases shown as examples as related to the most dominant theme of chemicals are demonstrated in Table 5.

Table 5

Details of the categories of the theme chemicals

Theme	*Categories*	*Sub-categories*	*%*
Chemicals	Not taking safety precautions while working with the chemicals at home, in the lab or outside	• Touching chemicals without gloves	39.2
		• Leaving the cap of formaldehyde bottles open	20.9
		• Keeping chemicals in places where children could reach	14.4

	Breathing hazardous chemicals	• Hydrochloric acid	15.7
		• Mercury vapor	7.8
	Using chemicals with unknown ingredients	• Medicines	7.8
		• Cosmetics	6.5
		• Herbal teas	3.3
	Excessive use of chemicals	• Fertilizers	4.6
		• Pesticides	3.9
		• Cleaning substances	3.3
	Drinking chemicals by mistake	• Poisonous substances	3.9
		• Acids	2.6
		• Bases	1.3
	Chemicals not rinsed sufficiently	• Cosmetics not cleaned from skin properly	1.9
		• Residues of detergents not removed from glasses	1.9

The reasons the participants provided generally signified their awareness of health problems such as irritations, allergies, side effects and environmental pollution in the context of chemistry-related cases. On the other hand, several participants provided irrelevant responses such as spending too much ATP (1.9%) and squeezing lemon juice into mineral water (1.9%).

4.3 Findings related to biology

Table 6 presents the preservice science teachers' examples along with their reasons for suggesting life-threatening cases in everyday life that can be explained in the context of a knowledge of biology.

Table 6

Turkish preservice teachers' claims regarding life-threatening situations in daily life in the context of biology knowledge

Themes	*Categories*	*%*	*Because it might cause…*	*%*
Environment	Damaging nature	33.3	Extinction	11.8
			Disturbance of ecological balance	9.8
			Health problems	7.8
			Decrease in O_2 amount due to forest damage	3.9
Food	Consuming food inappropriately	31.4	Health problems	31.4
	Consuming Genetically Modified Organisms (GMOs)/prepared/packaged	25.5	Diseases	11.8
			Negative effects on hormones	9.8

	food		Addiction	3.9
	Consuming unknown food	15.7	Poisoning	7.8
			Health problems and death	7.8
Laboratory	Working in the laboratory imprudently	17.6	Harm to the respiratory system	7.8
			Skin irritations	5.9
			Harm and transfer of diseases by animals	3.9
	Changing the genes of living things	1.9	Disturbance of the ecological balance by forming new species	1.9
Hygiene	Not taking care of hygiene	15.7	Spreading of microbes	11.8
			Problems after surgical operations	3.9
	Not caring for wounds	1.9	Infections due to microbes	1.9
	Being around the people who have an infectious disease	1.9	Contamination with viruses	1.9
Medicines/ Cosmetics	Use of medicines/cosmetics without conscious control	13.7	Harm to the body	7.8
			Resistance to bacteria and difficulty in treatments	3.9
			Side effects	1.9
Plant- and animal-associated cases	Dog/snake bites	5.9	Infection of humans with their microbes	3.9
			Poisoning	1.9
	Not getting pets vaccinated	1.9	Transfer of disease to humans	1.9
	Contact with various plants	1.9	Health problems/poisoning	1.9
Others	Smoking	5.9	Harm to lungs and general health	5.9
	Lifting heavy materials	1.9	Harm to the skeleton and hernias	1.9
	Exposure to radiation for a long time	1.9	Mutations and harm to pregnant women especially	1.9
	Getting married despite blood incompatibility	1.9	Health problems	1.9

According to Table 6, the cases of preservice teachers' daily life-threatening situations that could be associated with biology knowledge were mostly related to the themes of environment and food. Table 7 shows the details of the theme of food.

Table 7

Details of the theme of food

Theme	*Categories*	*Sub-categories*	*%*
Food	Consuming food inappropriately	• Too much sugar/salt	10.5
		• Eating food after its best-before date	6.5
		• Eating vegetables/ fruits without washing them properly	5.2
		• Eating yoghurt with fish	3.9
		• Drinking water that has not been analyzed	3.3
		• Going to sleep just after having a meal	1.9
	Consuming GMOs/prepared/ packaged food	• Eating GMOs	13.1
		• Eating prepared/packaged food sold at the markets	12.4
	Consuming unknown food	• Several types of mushrooms	9.8
		• Unknown fruits/ vegetables	5.9

As in the previous cases mentioned, the reasons the participants provided were associated with health problems. When examined in detail, it was seen that the participants asserted that consuming food inappropriately was a daily life-threatening situation because this might cause obesity, high blood pressure, insulin resistance, diabetes, fatty liver, problems in digestion and intestinal parasites. On the other hand, 1.9% of the participants made irrelevant claims such as working with Z bacteria.

5 Discussion

The presented study revealed the various claims of preservice science teachers regarding daily life-threatening situations. The study focused on the association of scientific knowledge with daily life, which is one of the aims of science education. The association of science with daily life has an important place in cognitive and affective development and improving students' skills (Çepni et al. (2017). Also, preservice teachers made connections with various health issues. The research has thus introduced a different approach to scientific knowledge-daily life association studies. In this way, the study has made contributions to health education studies in science education which Harrison (2005) has said have been ignored. Additionally, the introduction of "safety and health issues" into the school curriculum has been indicated to be essential at all levels to prepare students for future life (Ižová, 2011).

Considering the results of the study, it is obvious that various situations asserted by the participants gathered under specific categories at 10% and above, whereas the others remained below this rate. The cases with percentages of 10% and above were accepted as being the dominant responses. The next part of the paper

will focus on comparisons generally based on results yielding rates of 10% and over.

The cases that preservice teachers brought up as life-threatening situations in the context of physics knowledge were dominant in the categories of electric shock and problems with electric items. In another study, it was also found that Finnish high school students were interested in the effect of strong electric shocks on the human body (Uitto, Juuti, Lavonen, & Meisalo, 2006). On the other hand, the participants pointed out a number of claims with relatively lower percentages. One of these claims pointed to the impact of earthquakes causing injuries, deaths and loss of property because of improperly reinforced buildings. In his study, Bulut (2020) highlighted the importance of providing pre-school children with disaster education and disaster awareness since they will be the builders of the future. Also, the present study revealed the extensive use of cell phones as a hazardous situation among the participants' claims. However, another study reported that more than 70% of preservice teachers stated they were not concerned about the impacts of radiation from the frequent use of cell phones (Ratnapradipa, Rhodes, & Brown, 2011). Moreover, the effect of radiation on the human body was also determined to be a subject that students found interesting to learn about in Uitto et al.'s (2006) study.

The results obtained from of the claims of the participants that depended on knowledge of physics also demonstrated several misconceptions. Firstly, the preservice teachers revealed a misconception related to open and closed circuits that might have stemmed from the language structure of Turkish. The participants thought that the circuit flowed when the switch was open. This finding was consistent with the literature (Önder, Şenyiğit, & Sılay, 2017). Also, they perceived loud sounds were the same as ultrasound and indicated that ultrasound was harmful to the ears. The findings revealed another misconception and showed similarity with one of the results of a previous research article (Adekanmi et al., 2012). Adekanmi et al.'s (2012) study conducted with Nigerian women indicated that several participants thought ultrasound was injurious to health. Moreover, some preservice teachers had insufficient knowledge and could not explain frictional force and the friction coefficient. Instead, they preferred to use the term "friction" in indicating that ice caused less friction. This result was similar to the finding of Sari, Ramdhani and Surtikanti (2019), which also showed that the participants' responses referred to friction but did not contain frictional force. Furthermore, the preservice teachers highlighted a relationship between friction and the surface area of a shoe whereas friction is independent of the surface area of an object.

When the claims of the preservice teachers regarding chemistry were investigated, the majority of their claims were seen to be related to their concerns about the safety precautions in the laboratory, at home or in other environments. This result might have been influenced by laboratory studies in chemistry courses and in the comprehension regarding the significance of

working properly with chemicals. Miller, Heideman, and Greenbowe (2000) stated that university students must also bear responsibility for dealing with experimental risks as well as for increasing regulatory actions designed to minimize hazardous situations. Also, breathing hazardous chemicals, using chemicals with unknown ingredients, mixing various chemicals and the excessive use of chemicals were among the dominant responses. Similar to the responses of the preservice teachers in the present study, Finnish high school students were found to be interested in the effects of some cosmetics on skin such as lotions and creams, and in pesticides and artificial fertilizers (Uitto et al., 2006). On the other hand, various cases were mentioned at lower percentages, such as not using filters in factory chimneys, using plastic bags unnecessarily, radiation and acid rain. Yet, the participants paid attention to chemistry-environment concerns as well as to chemistry-associated human health concerns. A similar finding was also determined in the study of Mandler et al. (2012).

According to the results of the present study, when the numbers of the categories were considered, among the three branches considered, more dominant cases were found to belong to biology (n=7), which was followed by chemistry (n=5) and physics (n=2). However, this finding contradicted what was obtained from Balkan-Kıyıcı and Aydoğdu's (2011) research. Their research reported that teacher candidates were more likely to associate their physics knowledge with daily life; their examples of lesser dominance were within the scope of chemistry knowledge and biology knowledge.

The results of the study in the context of biology revealed that consuming GMOs was identified as a hazardous situation. However, another study conducted with preservice teachers in the U.S. showed that participants had a high tendency to accept altering the genes of fruits to make them tasty or adding genes to plants to increase their nutritional value (Chabalengula, Mumba, & Chitiyo, 2011). On the other hand, the present study indicated various lower percentage cases such as getting married despite blood incompatibility, exposure to radiation, being around people with an infectious disease, not caring for wounds, lifting heavy materials, smoking, contact with some plants, dog/snake bites and not getting pets vaccinated. The study conducted by Uitto et al. (2006) also showed similar interests of Finnish high school students, such as the effect of tobacco, dangerous and threatening animals, poisonous plants, epidemics and diseases, reproduction and gene technology.

While various situations were suggested by the participants, other situations seemed to be ignored. These might be illustrated as decompression sickness in the realm of physics, global warming/climate change, keeping plastic water bottles under sunlight, firedamp explosions in the realm of chemistry and travelling to different locations without getting properly vaccinated and having computer tomography in the context of biology. The cases of decompression sickness, firedamp explosions (Yadigaroğlu et al., 2017) and global climate change (Ratnapradipa et al., 2011) were seen to be investigated in previous

research. On the other hand, the study showed that radiation was addressed in the three branches of science among the preservice teachers' responses. However, the percentages of the claims related to radiation were relatively low. This might be due to the relatively low awareness levels of students as reported in a previous piece of research (Dolu & Ürek, 2015).

When the participants' reasons were considered, it was seen that their focus was mostly on health problems. It might be concluded that the participants are aware of various health problems. Also, Krásna's (2014) study indicated that the majority of Slovakian secondary school students perceived the concept of health as the most important value in life and for this reason they also mentioned healthy diet, healthy food, no smoking and hygiene as elements of maintaining an individual's healthy condition. The findings in the present study might be attributed to the effect of the participants' educational status as in the study by Ross and Mirowsky (2011). This was relatively more obvious in the reasons they offered in the context of biology. A number of health problems, from insulin resistance to hormonal disorders, were mentioned by the participants. This finding was consistent with the results of previous literature which detected several diseases in preservice teachers' responses in terms of connecting biology to daily life (Çepni et al., 2017; Mercan et al., 2019; Uitto et al., 2006). Also, the participants mentioned poisoning and irritations in the respiratory system in the context of chemistry. On the other hand, they showed a more general approach when talking about health problems in the context of physics, mentioning deaths and injuries in their examples. Yet they talked about more detailed cases such as harm to the eyes due to eclipses and using the wrong type of eyeglasses in the context of their physics knowledge. Furthermore, the participants were found to mention environmental problems as the reason for some of the life- threatening everyday cases they suggested. This finding was consistent with Çepni et al.'s (2017) study. Science teacher candidates in their study also mentioned environmental pollution at the highest percentage in terms of connecting biology to daily life in an environmental science course. The concerns of the participants related to environmental health issues paralleled the attitudes of American teacher candidates (Ratnapradipa et al., 2011). The researchers showed that 90% of the participants considered what effects environmental health issues would have on their families and on themselves.

Conclusion

To conclude, the results of the present study indicated that third-year science teaching students associated their scientific knowledge with daily life-threatening situations at various levels and they were aware of health and environmental issues that affected their suggested cases. However, there were also gaps in their scientific knowledge-daily life association. Additionally, several misconceptions were encountered in their explanations. A limitation of

the study was that the findings were obtained from only three state universities in Turkey.

The results of the study are recommended for utilization in designing units based on the suggested cases for various undergraduate courses such as Environmental Science or Science Teaching Laboratory Practices taught at the education faculties. As explained by Uitto et al. (2006), students' interests might trigger better science learning. Hence, science educators might find it useful in their context-based approaches, to consider in detail in their courses the various contributions of the students in the study regarding the topics that interested them. It will also be beneficial to consider situations that have not been mentioned by the participants. This will provide the opportunity to enrich the content of some courses and make them more attractive to students. Currently relevant topics could be discussed in the classroom environment in order to raise the awareness levels of preservice teachers. Finally, similar investigations might be conducted in different countries so that it might be possible to make further comparisons.

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