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School-Based Improvement in VET: "The 1,000 Schools in Vocational Education and Training Project"

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ABSTRACT

Vocational education and training (VET) faces a significant transformation after the 2000s, due to the widespread use of automation and artificial intelligence-based production technologies. VET also has other troubles including higher student flow to academic track and higher rate of socioeconomically disadvantaged students in VET institutions. In this context, it is of great importance to improve the school climate of VET institutions. The "1,000 Schools in Vocational Education and Training Project" was initiated by the Ministry of National Education (MoNE) in order to extend the paradigm shift in recent years in VET. This study aims to evaluate how school-based improvements are made across Turkey in the project. The project, which is the largest-scale programme for the improvement of Turkish VET system, covered approximately 25% of VET high schools in Turkey. Within the scope of the project, 1,000 disadvantaged schools based on education indicators were selected. As a part of a multi-staged support; more than one hundred thousand students attended academic support programs, and more than four hundred thousand students attended psychosocial support and trainings for coping with addiction trainings. The number of participants in pedagogical and leadership skill programme for teachers and school administrators has exceeded three hundred thousand. Parents' participation in open secondary schools, open high schools and vocational courses was encouraged, and more than eleven thousand parents attended these trainings. Within the improving of schools' physical infrastructure, new laboratories and libraries were established and workshops were renovated in schools. The project has proven that the school climate can be improved via a multi-staged support and it has become a practical model for the "10,000 Schools in Primary Education Project".

Keywords: Vocational education and training, educational equality, academic support, school climate.

Mesleki Eğitimde Okul Temelli İyileştirme: "Mesleki Eğitimde 1.000 Okul Projesi"

ÖZ

Mesleki eğitim, 2000'li yıllar sonrasında otomasyon ve yapay zekâya dayalı üretim teknolojilerinin yaygınlaşması nedeniyle önemli bir değişim sürecinden geçmektedir. Yükseköğretimin evrenselleşmesi ve sağladığı imkânlar dolayısıyla öğrencilerin akademik eğitime yönelmesi mesleki eğitime öğrenci akışını azaltmakta, mesleki eğitimde sosyoekonomik açıdan dezavantajlı öğrencilerin yoğunluğunun daha fazla olmasına yol açmaktadır. Bu bağlamda mesleki eğitim kurumlarının kendi ihtiyaçlarını merkeze alacak şekilde okul ikliminin iyileştirilmesi büyük bir önem teşkil etmektedir. Millî Eğitim Bakanlığı, son yıllarda mesleki eğitimde başlattığı paradigma değişimini daha da ileriye taşımak ve tüm mesleki eğitim kurumlarına yaygınlaştırılması amacıyla Mesleki Eğitimde 1.000 Okul Projesi başlatılmıştır. Bu çalışma, 2021 yılı içinde başarıyla gerçekleştirilen projede yapılan okul temelli iyileştirmelerin ayrıntılarıyla değerlendirilmesini amaçlamaktadır. Türkiye'de mesleki eğitimin iyileştirilmesi için yapılmış en büyük ölçekli projesi olan çalışma, tüm mesleki ve teknik Anadolu liselerinin yaklaşık %25'ini kapsamına almıştır. Proje kapsamında eğitim göstergelerine göre dezavantajlı olan 1.000 okul seçilmiş, ihtiyaçları gözetilerek okul ikliminin güçlendirilmesi sağlanmıştır. Öğrencilere yönelik akademik destek programlarına yüz binden fazla, psikososyal destek ve bağımlılıkla baş etme eğitimlerine ise dört yüz binden fazla öğrenci katılmıştır. Öğretmen ve okul yöneticilerine yönelik pedagojik ve liderlik becerilerine dair eğitimlere katılım sayısı üç yüz bini aşmıştır. Velilere ulaşılarak açık ortaokul, açık lise ve halk eğitim kurslarına katılımı teşvik edilmiş, on bir binden fazla velinin bu eğitimlere katılımı sağlanmıştır. Okulların fiziki altyapısının iyileştirilmesi için yeni laboratuvarlar kurulmuş, atölyeler yenilenmiş ve tüm okullara kütüphane kurulumu yapılmıştır. Proje, mesleki eğitimde okulların ihtiyaçlarını merkeze alacak şekilde bir iyileştirme yapılabileceğini göstermiş ve "Temel Eğitimde 10.000 Okul Projesi"ne öncü olmuştur.

Anahtar kelimeler: mesleki eğitim, eğitimde fırsat eşitliği, akademik destek, okul iklimi.

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1 | INTRODUCTION

Schools are central environments for education and affect the teaching processes with their quality (Maxwell et al., 2017; McMahon, Wernsman, & Rose, 2009). Therefore, schools' characteristics determine the approaches of the stakeholders involved in education, including students, teachers, school administrators and parents (Cotton, 1989; Doran, 2004; Finn & Voelkl, 1993). Thus, improvement of the school infrastructure and climate has a great potential for increasing educational performance (Barrera-Osorio, Fasih, & Aptrinos, 2009; The World Bank, 2013).

The school is at the center of education and the improvement of its' physical facilities and climate is reflected in educational outcomes (Holzberger et al., 2020; Schneider, 2002; Sweetland & Hoy, 2000). Therefore, improvement of the schools' infrastructure is among the factors that lead to better educational outcomes (Barrett et al., 2019). On the other hand, research since the 1950s has revealed that the impact of school climate is stronger on educational outcomes (Anderson, 1982; Cohen et al., 2009; Thapa et al., 2013).

School climate, the quality of students' school life including academic and social interactions at school, is decisive for students' educational outcomes (Kwong & Ryan, 2015). Research indicates that improving school experiences and belonging provide multi-dimensional benefits to students (Kutsyuruba, Klinger, & Hussain, 2015). Students in schools with a positive climate have higher achievement, positive attitudes towards education and school, and higher well-being (Kutsyuruba, Klinger, & Hussain, 2015; Lombardi et al., 2019; MacNeil, Prater, & Busch, 2009; Zysberg et al. Schwabsky, 2020).

The importance of school climate is well-known in educational research, however, it is a challenging task for educational authorities to improve the school climate. Because students' experiences at school are affected by many factors and it is necessary to consider these factors in making improvements. In this context, diverse practices to support the school climate are suggested such as increasing student-teacher and peer interaction, developing activities to develop social skills, creating a safe environment, providing academic and social support to disadvantaged students (Linda-Darling and Cook-Harvey, 2018).

While efforts to improve the school climate directly contribute to student outcomes, non-school factors have the opposite function, leading to the gaps between students, even widening them (Berliner, 2009; Hampden-Thompson & Johnston, 2006). These factors are beyond students' personal control and the widening of differences among students may lead to an increase in inequalities. Particularly students from low socioeconomic status (SES) may face educational difficulties due to limitations (Thomson, 2018).

Improving the school climate has a particular importance for disadvantaged students (Berkowitz, 2020; OECD, 2012). Education is the most important tool that countries use for providing a better future to disadvantaged students by compensating their drawbacks (Caillods, 1998). In all education systems, some students fall behind their peers for various reasons and face disadvantages (OECD, 2012). These students show more problematic behaviors such as high school drop-out, discipline problems and lower educational commitment (Banerjee, 2016; OECD, 2012). A positive school climate is of great importance in changing students' educational behaviors, enabling them to be more successful and increasing their sense of school belonging (Arum & Velez, 2012; OECD, 2012).

Supporting disadvantaged students by improving the school climate also provides significant social benefits. A more supportive, safer and interactive environment can mitigate the effects of socioeconomic differences among students (Berkowitz, 2016). Thus, the positive school climate is a powerful tool in coping with the early dropout (Kotok, Ikoma, & Bodovski, 2016), and it has an important potential for increasing disadvantaged students' employability (Crans et al., 2021). Considering that human capital is among the most important resources that countries have (Becker, 1962; Özer, 2021a), improving the school climate is a key factor for national development.

Promoting the positive school climate is even more important in the vocational education and training (VET) systems. Firstly, increases the rate of socioeconomically disadvantaged students among VET students is higher than academic education in many countries, including Turkey (Foley, 2007; Özer, 2020, 2021b; Suna et al., 2020; Traqueia. et al., 2020). Second, the practical training in VET requires frequent improvement of physical infrastructure and materials. Third, the diversity of vocational fields under the roof of VET leads to a remarkable variation in schools' needs. Therefore, it is critical to support the infrastructure and climate of VET institutions.

While VET systems need rich physical infrastructure and a positive school climate, they experience an important transformation process (UNESCO, 2012; Zhao, 2021). The rapid spread of technologies based on automation and artificial intelligence forces VET systems to adapt and transform (Özer and Perc, 2020; Perc, Özer and Hojnik, 2019). As a result of this change, the expectations of the labor market from VET systems have also changed (Özer, 2019a, 2020b). General cognitive skills, social skills such as adaptation, cooperation, and digital skills are prioritized in the transformation of VET (Barrera-Osorio, Kugler, & Silliman, 2021; ILO, 2021). These changes aim to train a human resource who can quickly adapt to the changes, have effective reasoning skills and work efficiently with others.

The VET system in Turkey has been undergoing a paradigm shift in Turkey in recent years. Numerous solid steps have been taken to renew the VET system based on the current needs of global transformation (Özer, 2018, 2019b). The Ministry of National Education (MoNE) has led these changes to make the VET system competitive on a global scale. The improvements included all elements of the VET system to lead a holistic improvement at national level (Özer, 2020a, 2020b, 2021b). Strengthening relations with labor market, expanding employment-priority or guaranteed VET programs, revision of education programs and curricula, increasing the compatibility between vocational fields and the labor market demands, supporting Research and Development (R&D), establishing prestigious VET high schools, and improving the conditions of vocational training centers (VTCs) regarding journeyman and mastership trainings are the prominent ones among these improvements (Özer, 2020a, 2020b, 2021b).

These improvements have led to solid outputs in the VET system in a short period. The number of students -including students with high academic performance- who prefer the VET track has increased significantly (MEB, 2020a, 2021). After these improvements, VET institutions started to produce innovative products, increased revolving funds greatly, and for the first time, exported their products (Özer, 2021c). Based on increasing production capacity and support, VET institutions have become main producers of the needed materials during the Covid-19 epidemic (Özer, 2020c). MoNE has initiated the "1,000 Schools in Vocational Education and Training Project" in order to disseminate these improvements to all VET institutions and to encourage a school-based improvement culture (Özer, 2021b, 2022). This project provides multidimensional support to particular VET high schools with various disadvantages, and enables these educational institutions to benefit from the recent improvements in the VET system. The project has become one of the most comprehensive projects in the Turkish VET system with a budget of approximately 1 billion TL including more than 600,000 students, more than 40,000 teachers and nearly 3,000 school administrators. This study aims to evaluate how school-based improvements are made within the scope of the project in detail.

SCOPE OF THE "1.000 SCHOOLS IN VOCATIONAL EDUCATION AND TRAINING" PROJECT

An analytical approach was used in determining the VET schools to be included in the project. In this manner, all VET high schools in Turkey are listed with their infrastructure deficiencies, student preference rates, mean academic achievement, grade repetition rates, disciplinary problems, absenteeism and drop-out rates. Additionally, provincial MoNE managers gave the feedback about the selected schools. Consequently, 1.000 VET high schools were selected through these parameters and the provincial managers' opinions. Figure 1 shows the rate of the schools, students and the teachers that were supported within the scope of the project in the VET system.

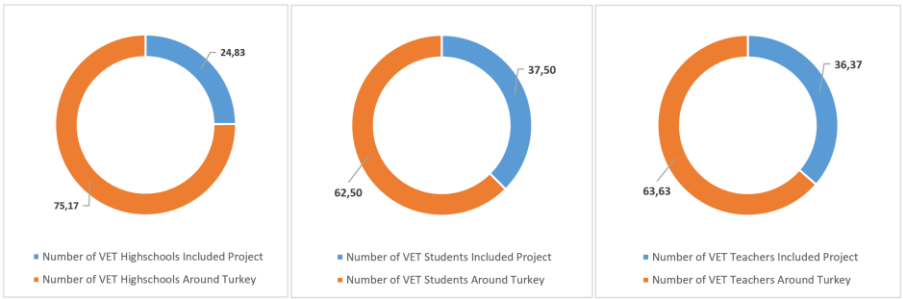

Figure 1. *Rate of Schools, Students and Teachers Supported under the 1,000 Schools in Vocational Education and Training Project**

**Total number of students, teachers and schools is taken from the Ministry of National Education Formal Education Statistics: 2020-2021.*

As seen in Figure 1, the project covers 1.000 VET high schools with 601.669 students and 48.959 teachers. In order to evaluate the scale of the project, formal education statistics of MoNE regarding the 2020-2021 academic year were used as a criterion. In this period, there were 4.027 public VET high schools, a total of 1.604.276 students received education and 134.609 teachers worked in these schools (MEB, 2021a). The project covered 25% of the public VET high schools in Turkey, approximately 38% of the VET students and 36% of the VET teachers. Inclusion rates of stakeholders indicated that the project is highly comprehensive.

Figure 2 shows the provincial distribution of the students and selected schools within the scope of the project.

Figure 2. a. *Distribution of Schools in Project*

Figure 2. b. *Distribution of Students in Selected Schools in Project*

**Total number of students, teachers and schools is taken from the Ministry of National Education Formal Education Statistics: 2020-2021.*

As seen in Figure 2, the schools included in the project spread over 81 provinces of Turkey. After Istanbul, Ankara, İzmir, Bursa and Antalya, where the total number of VET high schools is relatively high, provinces such as Gaziantep, Şanlıurfa, Diyarbakır and Hatay are high in the ranking indicating that the rate of disadvantaged schools is higher in these regions. The relatively high rate of schools included in the project in these provinces enabled more students, teachers, school administrators and parents to benefit from the project support. Therefore, the project is quite inclusive in terms of both the representation of VET high schools and the distribution of these schools across Turkey.

SCHOOL-BASED SUPPORT WITHIN THE SCOPE OF THE PROJECT

The school climate is affected by many factors, comprehensive support is vital to the schools for a holistic improvement (Carter, 2018). In this direction, the MoNE has planned to support the educational institutions and stakeholders in multiple stages. In the first step, the needs of the schools are discussed and the required infrastructure support is evaluated within. Then, the supporting strategy for diverse stakeholders including students, teachers, school administrators and parents was specified. Thus, the support given to schools and education stakeholders has been discussed under improvements on the physical infrastructure of schools, support for students, support for teachers and school administers, and support for parents headings.

IMPROVEMENTS ON THE PHYSICAL INFRASTRUCTURE OF SCHOOLS

One of the priorities of the project is the improvement of the physical facilities of the school environments. In this context, the physical infrastructure of 1.000 schools are improved significantly. The physical improvements included the small and large-scale renovations of schools, painting and cleaning, structure strengthening and restructuring of available areas.

Within the scope of improving the infrastructure; new laboratories were established, current workshops were renovated, and schools were equipped with new computers, digital blackboards and libraries. In this context, physics-chemistry-biology laboratories and 554 new workshops were established. Approximately 10 thousand digital blackboards were installed in 403 schools that needed these boards.

The revolving fund incomes are important for the increasing practical training and financial support of disadvantaged students. Thus, increasing the capacity of revolving fund incomes is defined as a target within the scope of the project. The increase in the revolving fund allows students to perform practical training and to earn from the production and services within the scope of VET education. According to this target, 544 new workshops and laboratories were established, and 282 workshops and laboratories were renovated. As a result of the improvements, the revolving fund income of 516 schools, whose production capacity was increased, reached approximately 13 million TL in 2021. Approximately 439 million TL was spent from the project budget for physical reinforcement of schools and infrastructure improvements.

In order to ensure the continuity of the physical improvements and increase the interaction between VET schools, the Inter-Institutional Sharing Project (Kurumlararası Paylaşım Projesi, KUPA) was initiated. VET schools were informed about the training materials which were available but not used in other VET institutions. The MoNE Information Technologies Department developed software for KUPA, and VET schools were encouraged for registration and sharing the available sources with other VET schools.

SUPPORT FOR STUDENTS

a. Support for Academic Skills

Academic achievement is among the basic education indicators representing educational performance. In Turkey, students' academic achievement has been tracked through large-scale assessments for monitoring and selection purposes (MEB, 2019, 2020b; Suna, Özer, & Tanberkan, 2020; Yalçın & Tavşancıl, 2014). The results of these large-scale studies show that the academic performance of VET students is lower than those in academic schools (MEB, 2019, 2020b; Suna, Özer, & Tanberkan, 2020; Yalçın & Tavşancıl, 2014). The comparatively lower achievement of VET students is also observed in diverse countries due to the fact that the rate of socioeconomically disadvantaged students in VET schools is higher and the practical education is prioritized in VET.

Supporting VET students' academic skills is important in two aspects: First, as stated earlier, the rate of socioeconomically disadvantaged students in VET institutions is relatively high. This increases the importance of academic support and remedial opportunities in these institutions. Secondly, academic support has an important role for students who want to continue tertiary education to achieve similar academic skills with those who graduated from academic educational institutions. Thus, it is important to provide academic support for students in VET institutions in the context of equal opportunity in education.

The first academic support provided to the students is presenting remedial education for students. In this context, the learning gaps of these students were determined by a standardized assessment tool, and then a remedial

program was initiated. The remedial program was structured to meet the specific needs of the group. Considering that the learning is a hierarchical process, first identifying the current learning gaps, compensating for these gaps, and then supporting new learnings provide significant benefits for disadvantaged students.

Two different approaches were conducted concurrently to support the academic skills of the students. The first, 40,951 students participated in remedial programs specially developed for participants. Secondly, the practices within the scope of Support and Training Courses (DYK), which have been implemented by the MoNE for years, were also carried out in 81 schools within the scope of the project. 62,283 students benefited from 6,544 DYK courses in schools within the scope of the project. The General Directorate of Secondary Education (OÖGM) and the General Directorate of Assessment and Examination Services (ÖDSHGM) developed education materials for providing academic support to these students. In this perspective, 358,831 educational materials were delivered to the students. Those materials included books, tests, fascicles and physical teaching tools.

One of the other aims of the project is using students' vocational skills and transforming these skills into concrete outputs. The practice-oriented education in VET provides an important opportunity for students and teachers to develop projects and products which stand for intellectual property. MoNE developed a training programme regarding intellectual property, and students and teachers participated in these trainings. In this training, students were informed about the benefits of intellectual property and industrial rights, the criteria they need to consider in production and the application processes. Thus, these training sessions were beneficial for students and teachers to learn how to transform their ideas into a project and product, and how to register these products officially. Science and Art Centers (BİLSEMs), which are highly experienced in project and product development, played an active role in providing the training needed. The teachers in BİLSEMs shared their experiences on the production and registration of patent, utility model and design-trademark.

b. Support for Social, Cultural and Sporting Skills

The main purpose of education is to develop students' cognitive and social-emotional skills concurrently. In this context, education becomes an important tool in ensuring the multi-aspect development of the individuals. Thus, the support to students within the scope of the project was structured to improve their academic, social, cultural and sportive skills concurrently. The number of students participating in these activities is presented in Figure 3.

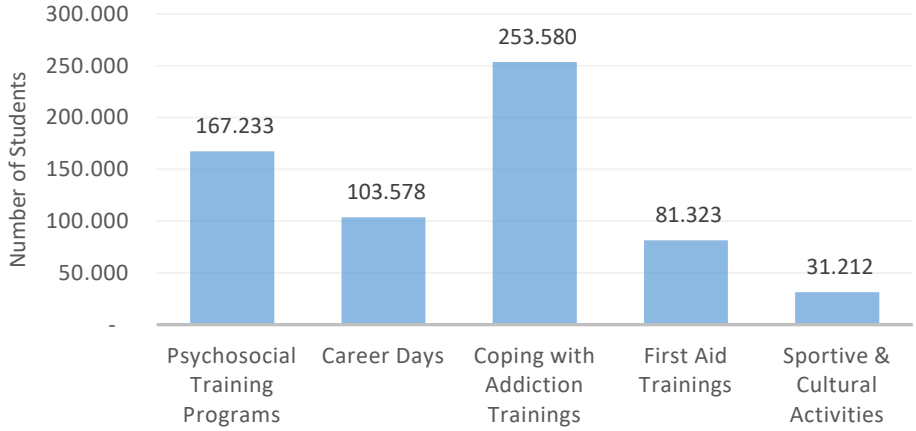

Figure 3. *Student Activities within the Project and Participation of Students**

**The number of students is calculated by combining different trainings offered for the same purpose.*

One of the priorities of the project is to increase the psychological resilience of students and support their well-being during the Covid-19 pandemic. For this purpose, school counselors were trained on "Psychological Resilience in Schools". Students are encouraged to participate in psychological resilience and wellbeing programs at their school. As a result of these efforts, 131.925 students participated in the psychological resilience and wellbeing programs, and 35,308 students participated in the Covid-19 psychoeducation program at their schools.

One of the important aspects of the project is to increase the interaction between diverse secondary education institutions by building educational bridges. VET high schools were associated with Fine Arts High Schools in their own or nearby provinces. The students in Fine Arts High Schools showed artistic performances in diverse fields, and gave training to students in VET high schools. Developing students' sportive skills has been determined as a goal and 126 Youth Centers have been established in cooperation with the Ministry of Youth and Sports. In these centers, sports and cultural activities were performed with the participation of 16,185 students. Within the scope of the project, 1,584 students were taught to swim.

Students' social skills and their participation in social activities are also significantly related to educational outcomes (MEB, 2021b). In addition, studies show that socioeconomically disadvantaged students benefit inadequately from social and cultural activities. In order to compensate for the disadvantages in VET and to increase the participation of VET students in these activities, the participation of the students in activities such as cinema, theater, museum and exhibition was encouraged. During the one-year period of the project, 15,027 students participated in these cultural activities.

It is beneficial for students to explore available career paths and to meet successful people in different fields so that they can make conscious career choices. During the project, 5,429 career days were organized and 103,578 students met with successful professionals in different fields. In the selection of people who will participate in the career days, professionals who are successful in science, art, culture, sports and industry were preferred.

Addiction is among the threats to the physical and psychological health of students. Beyond addictions to harmful products such as drugs, tobacco products, and alcohol, negative consequences of digital addiction also threaten the youth. In particular, the Covid-19 pandemic has the potential to increase the screen use and game addiction as well as digital bullying. In this context, training on coping with the physical and digital addictions were conducted with the participation of 131,925 students. Again, for the same purpose, MoNE cooperated with the Green Crescent, and 121,655 students participated in training in coping with addictions.

SUPPORT FOR TEACHERS AND SCHOOL ADMINISTRATORS

Teachers mediate the student learning and directly affect the quality of the educational process (Margrain, 1978). In fact, there is a general consensus that teacher qualifications are the most determining variables on students' outcomes (Rice, 2003). Based on the research results, investments in teacher training have remarkably increased in many countries (Özer, Suna, & Sunar, 2021).

One of the important dimensions of the project is to support the knowledge and pedagogical skills of the teachers. First of all, 32,984 school administrators and 280,058 teachers participated in the training regarding project awareness and efficiency, personal development and leadership skills. Training on first aid was carried out with the participation of 45,037 teachers. 20,439 VET teachers attended the on-the-job and professional development training. In addition, 157 school counselors successfully completed the “Turkey Fight Against Addiction” practitioner training course.

SUPPORT FOR PARENTS

It is known that the academic achievement of the children with high parental involvement and higher education levels on the side of parents is significantly higher than other students (Gooding, 2001; Topor et al., 2010). Therefore, the education level of the family and involvement in education are very decisive on student achievement. Thus, the education level and participation of the families are considered an important dimension in the project.

First of all, MoNE reached the students’ parents in the schools within the scope of the project. Families were informed about the scope of the project and the benefits of graduating from higher education levels. By interviewing the families, they were prioritized to enroll in open secondary school or open education high school according to their demands. Additionally, parents were asked about the vocational skills they would like to acquire and related training sessions were provided through lifelong learning courses. 9,228 parents participated in the training for families, and a total of 11,058 parents were enrolled in open secondary school, open education high school and vocational training courses.

Finally, the “Vocational High School Students Meet with Families” project, which has been successfully implemented by the MoNE for years, was included in this project. The VET students used their vocational skills to meet the basic needs of the parents within the scope of the project. In this context, the VET students worked intensively to meet the needs of the parents from painting and whitewashing to the repair of furniture, and the distribution of some products produced for the elderly people. Within this context, a total of 21,390 VET students visited 13,892 families in diverse provinces of Turkey.

4 | DISCUSSION & CONCLUSION

VET systems face a major transformation due to the technological changes experienced after the 2000s around the world. The employment opportunities provided by higher education on a global scale increase the tracking of students towards academic education. On the other hand, automation and artificial intelligence-based technologies change the skills that VET graduates are expected to gain (Acemoğlu & Restrepo, 2018; Özer, 2020b). In addition, the concentration of socioeconomically disadvantaged students in VET and the practices of school tracking increase the number of students who need additional support (Özer, 2020a; Suna & Özer, 2021).

These difficulties faced by VET have increased the importance of supporting educational institutions with diverse mechanisms. Thus, the school-based planning and improvement is vital for achieving a holistic improvement in VET institutions. Approaches for school improvement focus on strengthening the school with all its aspects. Otherwise, the improvements are likely to reveal only partial results and inadequate impact.

MoNE took a major step in school-based improvement in 2021 with the “1,000 Schools in Vocational Education Project”. The project was among the largest-scale projects and provided support to all education stakeholders. During the implementation of the project, all the stakeholders involved in education were trained, and the physical infrastructures and opportunities were improved. As suggested by the OECD (2012), multidimensional support for education stakeholders is one of the most effective ways to increase education quality by overcoming the disadvantages.

Supporting VET institutions is also important in terms of mitigating the achievement gap between schools, which is one of the chronic problems of the Turkish education system. As it is known, VET high schools are among the comparatively low-achieving educational institutions in Turkey for many years (MEB, 2019, 2020; Suna, Tanberkan, & Özer, 2020; Yalçın & Tavşancıl, 2014). In fact, achievement gaps between schools arise in primary education, increase their strength over time and become more visible in secondary education after school tracking (Özer, 2021a).

The “1,000 School Vocational Education and Training Project” is critical to show that multidimensional support can be provided to schools by taking into account their needs across Turkey. The context of the project was not limited to a single province or region, in contrast, was extended to more than 30% of VET education in Turkey. Considering the contribution of this project to schools, the Ministry recently initiated the "10,000 Schools in Primary Education Project" in 2022 (MEB, 2022). In this project, a similar approach is adopted focusing on the needs of the school and empowers all stakeholders.

The “1,000 Schools in Vocational Education and Training Project” has become a major step taken by the MoNE in recent years to support students. Because large-scale projects such as the “Remedial Education & Support Programme in Primary Education (İYEP) and Support and Training Courses (DYK) continue to be implemented by the MoNE (Özer, 2022). In addition, the production and printing of monthly educational resources, the establishment of libraries in all public schools, and the increase in schooling rates in pre-school education also help to alleviate the achievement gaps between schools (MEB, 2022; Suna & Özer, 2022). These contributions and projects are also in coherence with the OECD suggestions for school improvement and supporting disadvantaged students (strengthening school leadership; stimulating a supportive school climate; attracting, supporting and retaining high quality teachers; ensuring effective classroom learning strategies, and prioritizing linking schools with parents and communalities) (OECD, 2012). These projects are also in line with the projects on supporting disadvantaged students via extra-classes, academic supports, and their social skills via social clubs and activities in UK and US as Hamilton Project (Ander, Guryan & Ludwig, 2016; Cullen vd., 2018). Therefore, the MoNE’s improvements focus on schools will contribute to the holistic development of educational quality in the long run.

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A Qualitative Exploration into Beliefs of Pre-service EFL Teachers about School Experience

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ABSTRACT

This qualitative study aims to explore the beliefs of Turkish pre-service EFL teachers about their school experiences and any change in their beliefs during this experience to identify their professional development as prospective teachers. For this purpose, ten Turkish pre-service EFL teachers at a state university in central Turkey reflected their experiences for one semester in the process of their teaching practice period for 14 weeks. The results reveal that pre-service teachers hold different beliefs about overall approaches to teaching and learning a foreign language, language use in the classroom, classroom management, and teaching grammar. The results also indicate a change in their beliefs related to questioning selves as teachers, teaching profession in general, use of technology in the classroom, using teaching techniques, and classroom management. The findings of this study also have implications for teacher education programs, particularly for the school experience component.

Keywords: pre-service teacher beliefs, professional development, change in beliefs, school experience, reflection

Yabancı Dil Olarak İngilizce Öğretmeni Adaylarının Okul Deneyimine Yönelik İnançlarının Nitel Bir İncelemesi

ÖZ

Bu nitel çalışma, Türkiye'deki yabancı dil olarak İngilizce öğretmeni adaylarının, gelecekteki öğretmenler olarak mesleki gelişimlerini tanımlama bağlamında okul deneyimlerine yönelik inançlarını ve bu okul deneyimi boyunca yaşadıkları tecrübeler sonucu inançlarında oluşan değişiklikleri araştırmayı amaçlamaktadır. Bu amaç için, Türkiye'nin merkez bölgelerinden birinde bir devlet üniversitesinde öğrenim gören on yabancı dil olarak İngilizce öğretmeni adayı 14 hafta boyunca öğretmenlik deneyimleri süresince edindikleri tecrübeleri yansıtmıştır. Çalışmada elde edilen bulgular, öğretmen adaylarının, genel anlamda bir yabancı dil öğretimine ve öğrenimine, sınıf içinde dil kullanımına, sınıf yönetimine ve dilbilgisi öğretimine yönelik farklı inançlara sahip olduklarını göstermektedir. Ek olarak, elde edilen bulgular, öğretmen adaylarının öğretmen kimliklerini sorgulamaya, genel anlamda öğretmenlik mesleğine, sınıf içinde teknoloji kullanımına, öğretim yöntemlerinin kullanımına ve sınıf yönetimine yönelik değişen inançlara sahip olduklarını da göstermektedir. Bu çalışmadan elden edilen bu bulgular öğretmen eğitimi programları, özellikle bu programların okul deneyimi kısmı için çeşitli öneriler sunmaktadır.

Anahtar kelimeler: öğretmen adaylarının inançları, mesleki gelişim, inanç değişimi, okul deneyimi, yansıma

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1 | INTRODUCTION

Through a shift of understanding in teacher education, specifically in second language teacher education, there have been many attempts to investigate how pre-service teachers have been going through the notion of teachers as learners of teaching (Smith, 2017). Within this framework, research investigating the beliefs of pre-service teachers and in-service teachers has grown, offering new ways of thinking about teaching and the nature of teacher learning. Ever since Shulman's (1986) research on subject matter knowledge in line with the missing paradigm referring to those neglected domains of teacher knowledge, researching the psychological constraints behind teachers' teaching practices has become famous (Zheng, 2009).

Teacher beliefs have crucial conceptual roles in understanding teachers' thought processes, instructional practices and changes in the ways they learn to teach. Therefore, pre-service teachers, who are on the verge of being certified to teach, might have certain beliefs, expectations and concerns about understanding teaching and learning at the beginning stage of their teaching practice experience. Before starting teaching practice, these beliefs might or might not match, affect their understanding of teaching, shape and develop their teaching philosophies in general in positive or negative ways (Löfström & Poom-Valickis, 2013; Uibu et al., 2017).

This study is significant because it will hopefully contribute to the discussion of theory and practice in teacher education programs. It focuses on the school experience component through which pre-service teachers get the chance to see actual practices of the theories learned at the university. Hopefully, the study provides suggestions for teacher education programs that will help design courses effectively. Similarly, Johnson (2009) highlights the discussion of teachers as learners of teaching in teacher education. Even though many studies focus on the practicum experience of pre-service teachers, few studies focus on the school experience component where pre-service teachers do not teach but only observe teaching. The results of this study are expected to provide insights into how teachers experience the teaching profession in natural settings after having taken a theoretical course for a long time.

2 | LITERATURE REVIEW

In its broadest and widely cited sense, beliefs are "psychologically held understandings, premises or propositions about the world that are felt to be true" (Richardson, 1996, p. 106). Borg (2001) defines belief as "a proportion which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual and is therefore imbued with emotive commitment; further it serves as a guide to thought and behaviour" (p. 186). The role and importance of teachers' beliefs have a trendy place in teacher education literature. Nevertheless, belief itself is only one form of a complete cognitive system that includes terms such as attitudes, values, perceptions, theories, and images (Richardson, 2003); and perspectives, frames of references, conceptions, world images, schemata, constructs (Anderson & Bird, 1995). Similarly, the term teacher cognition by Borg (2003) also refers to the "unobservable cognitive dimension of teaching; what teachers know, believe, and think" (p. 81). This study defines beliefs as a broad term that encompasses many of these.

PRE-SERVICE TEACHER BELIEFS

In a comprehensive study reviewing the literature of learning-to-teach studies, Kagan (1992) confirms that "pre-service teachers enter programs of teacher education with personal beliefs about teaching images of good teachers, images of self as teacher, and memories of themselves as pupils in classrooms" (p. 142). Whether these beliefs are implicit or explicit, they sure "reflect the ways in which they intend to behave and interact with students, how they judge theories of student learning, organise and manage the classroom effectively, and behave professionally with their school colleagues" (Tillema, 1998, p. 217).

The understanding that pre-service teachers have their own beliefs about learning and teaching before entering teacher education programs has many implications. As Joram and Gabriele (1998) suggest, "the notion that learners come to a domain with prior knowledge and beliefs that influence how they construct new knowledge is a key principle in contemporary learning theory" (p. 175). However, this prior knowledge and beliefs might be potentially limiting, as Anderson et al. (1995) put it. Since beliefs are implicit, often unconsciously held assumptions (Kagan, 1992), they might have several properties. These assumptions might include

conceptualisations beyond reality that are not open to critical examination or evaluation by any outsider because they rely heavily on affective and evaluative factors (Nespor, 1987).

From an epistemological perspective, "learning is understood as the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience as a guide to future action" (Mezirow, 2012, p. 74). From a constructivist view of learning, beliefs are critical in how pre-service teachers comprehend and appreciate what they study (Richardson, 2003). Therefore, studies about teacher education programs emphasised pre-service teachers' beliefs. It is certain, then, that there is a clear connection between the beliefs of pre-service teachers and any action they would take in their teacher education programs and their teaching. However, Richardson (2003) stresses a critical point asking whether beliefs guide actions, actions guide beliefs, or there is an interaction between the two. When pre-service teachers bring their own beliefs into teacher education programs, their beliefs usually guide their actions. In the literature, different aspects of pre-service teacher beliefs have been studied in the Turkish context, such as efficacy beliefs (Eren & Yeşilbursa, 2019), emotional intelligence and beliefs (Öz & Çepik Kiriş, 2018), career development and leadership aspirations (Ölçü-Dinçer & Seferoğlu, 2018), change in cognition after practicum (Debreli, 2016; Kavanoz et al., 2017; Yüksel & Başaran, 2019), and changes in concerns about teaching (Yalçın Arslan & Ilin, 2018) among many others. Still, throughout the teacher education programs, the pre-service teachers' beliefs need to be guided by their actions (Richardson, 2003). At least, this might be the ultimate aim of teacher education programs in general.

Pre-service teachers' beliefs play an essential role in their professional growth. It is acknowledged that a high proportion of these beliefs consist of those pre-service teachers bring to teacher education programs from their early experiences. Johnson (2009) states that these beliefs are "constructed through and by the normative ways of thinking, talking, and acting that have been historically and culturally embedded in the communities of practice in which they participate (as both learners and teachers)" (p. 17) when approached from a socio-cultural perspective. While this view might suggest that it is hard to change such beliefs fundamentally constructed by social activities in which teachers engage, there are studies that both reflect stability and change in (epistemological) beliefs of teachers. Most of these reflections are based on empirical studies that investigated the impact of practice teaching on changing beliefs of pre-service teachers.

Primary necessities for change involve changing in believing what one does, in other words, one's attitudes and motivation. Therefore, talking about change would require consideration of such factors. Teacher education programs need to consider that beliefs, attitudes, and motivation play a significant role; and allow an understanding of the situations or conditions necessary for pre-service teachers' professional fulfilment and personal development. In the case of teaching, "motivations may therefore determine whether potential candidates elect to teach, how long they remain in the teaching profession, and the extent to which teaching undergraduates and graduates engage with a concentrate on their profession" (Sinclair et al., 2006, p. 1134). As Richardson and Placier (2001) also state, "many of the reforms being called for today, for example, constructivist teaching and teaching for understanding, require great changes in content and pedagogical knowledge and in understandings about schooling, teaching and learning. These instructional changes require belief changes and, therefore, cultural change" (p. 938). This study investigated pre-service teachers' beliefs and stated changes in their beliefs within the school experience component of teacher education programs.

PRE-SERVICE TEACHER EDUCATION IN TURKEY

Geographically situated in a position connecting the two continents, Asia and Europe, Turkey has seen significant reforms and innovations in its teacher education policies since the 1920s. The Turkish educational system was centralised and put under the control of The Ministry of Education in 1924 by the Law of Unification of Instruction. All policy and administrative decisions, then, have been made by the Ministry of Education, including the appointment of teachers, selection of the curriculum to be implemented, and the textbooks to be used (Çakıroğlu & Çakıroğlu, 2003). Two significant changes in teacher education in Turkey followed in 1973 by the Basic Law for National Education and in 1981 the Council of Higher Education. Before these changes, teachers were trained through teacher schools or institutions of education. The second significant change in 1981 decided that all teachers were to be trained in faculties of education, which meant that the Council of Higher Education was responsible for teacher education. Today, pre-service teacher education is conducted in four-year teacher education programs in respective departments at the Faculties of Education, under the broader control of the

Council of Higher Education (Akşit, 2007; Çakıroğlu & Çakıroğlu, 2003). With the most recent curriculum, the courses offered in teacher education programs compose of three groups of subject-matter knowledge (45-50%), teacher professional knowledge (30-35%) and general knowledge (15-20%) related to various social issues (Yükseköğretim Kurulu [YÖK], 2018).

TEACHER PRACTICE IN THE TURKISH CONTEXT

The Turkish teacher education curriculum offers two courses for the teaching practicum in the fourth (final) year of the program. The first of these, called the school experience course, focuses on the real-life classroom experience through structured observation tasks. Under the supervision of a cooperating teacher, prospective teachers visit classrooms, observe teaching, carry out tasks that help them lay the foundations of teaching, giving them an overview of the school experience. The second course, teaching practice, focuses on the one-to-one application of all the theoretical knowledge learned at the university in real-life classrooms with structured and on-the-spot teaching tasks. With the updated curriculum in 2018, these courses are now called Teaching Practice I and Teaching Practice II though the contents are the same (Yükseköğretim Kurulu [YÖK], 2018).

3 | METHODOLOGY

RESEARCH DESIGN AND QUESTIONS

This study uncovered pre-service teacher beliefs and any stated changes in their beliefs throughout their school experience. To achieve this purpose, having detailed and rich data was crucial that best described and reflected the aims. Accordingly, a case study was conducted within the framework of qualitative research methodology. The following section explains the rationale behind the choice of this methodology in detail. This study identified the beliefs of pre-service EFL teachers studying at a state university in Turkey before taking a school experience course concerning their teaching practices. Another aim of this study included tracking any stated change(s) that occurred in the beliefs of these pre-service EFL teachers throughout the 14-week school experience course. In accordance with the aims, this study answered the following research questions: (1) What beliefs, concerns and expectations do Turkish pre-service EFL teachers have about teaching before taking a school experience course? (2) Do these beliefs change throughout their 14-week school experience course?

PARTICIPANTS AND SAMPLING

Participants in this research were ten prospective English teachers in the last year of their teacher education program at a public university in central Turkey, which provides English-only education in its courses. As part of the undergraduate teacher education program, students take a school experience course in the first semester of their senior year, focusing on observing classroom teaching in local public or private schools. As a requirement of this course, the pre-service teachers observe classes taught by mentor teachers. They might even help these mentor teachers by doing in-class activities with the learners without fully immersing in the actual teaching experience. As another requirement of this course, the students write reflection and observation papers about their experiences on classroom practices periodically. They are also involved in online discussions by writing comments to their peers' discussions through an online platform.

Typically, the pre-service teachers visit schools as part of their school experience course differ in terms of level and type; they might observe classes from Grade 4 to Grade 8 at primary and secondary schools and from Grade 9 to Grade 12 at high schools. These schools are either public or private schools; all run under the Ministry of National Education. In this study, there were initially 31 students taking the school experience course at the teacher education program. However, criterion sampling was used in selecting 10 of these participants for the following reasons: the selected students needed to have completed the two reflection papers, which were due at the beginning and the end of the course. Also, these students were selected among those who were observing the same grades at the practice schools (primary school, grades 6 and 7) so as to eliminate any potential effect the grade levels would have caused in shaping their beliefs. When these two criteria were considered, the ten pre-service teachers who met these criteria were chosen as participants in this study.

DATA COLLECTION AND ANALYSIS

Data collection was carried out in two phases. For the first phase, reflection papers were collected. The pre-service teachers were assigned to hand in two papers; one before the course started and another after the course was finished. The first set of reflection papers was about their approaches to teaching in general, that is, their teaching philosophies about the classroom practices they would carry out. The second set of reflection papers was about their overall ideas and comments about their actions over the course period. For the second phase of the data collection process, weekly online forum discussions of pre-service teachers were collected. Each prospective teacher was supposed to actively participate in the discussions assigned by the instructor on an online platform related to things they were doing and observing in classrooms at the schools. These discussions were about their expectations from the course, their concerns, their ideas about matters raised in class discussions and any point they liked to highlight related to teaching in general. Participants and the course instructor consented to share these papers and forum discussions to be analysed and reported in this study. The first round of reflections and weekly discussions were used to answer research question one. The second round of reflections and weekly discussions were used to answer the second research question in this study.

Due to the nature of the data sources of this study, an inductive approach was adopted by means of thematic analysis using Boyatzis' (1998) data-driven code development model. It has the following stages; "a. reducing the raw information; b. identifying themes within subsamples; c. comparing themes across subsamples; d. creating a code; and e. determining the reliability of a code" (p. 45). The raw information, which was the reflection papers and the forum discussions of the pre-service teachers, was outlined according to their content. Later, this outlined content was used to create themes, followed by a process in which these themes were compared across subsamples (reflection papers vs reflection papers, forum discussions vs forum discussions). After that comparison, similar themes were chosen as codes to be used in the analysis. The exact process was also conducted with the same data by a second coder to ensure the reliability of the themes and codes. Thus, two researchers analysed and coded the data separately to ensure inter-coder reliability. In cases of disagreement, which were not many, they had discussions to improve precision.

RESEARCH ETHICS

This study strictly followed the academic research ethics were strictly followed in all its phases. In accordance with APA's ethical principles and code of conduct, the study was submitted to the Applied Ethics Research Centre of the institution in which the participants were studying, and the Human Research Ethics Committee approved. Besides, the participants were informed that their reflection papers would be used for academic research purposes and that parts of their written work would be presented in this study after masking their identities. Participant consent was taken from each pre-service teacher to use their written assignments. They were also informed that their participation in this study was completely voluntary and that they would withdraw at any point without having to present excuses. Same ethical principles and code of conduct were followed in collecting, analysing, reporting, and storing the participants' work and citing all the sources as appropriate in the references section.

4 | RESULTS

This section presents the results under themes that emerged from the qualitative analysis, with reference to the participants' own words to illustrate their beliefs.

BELIEFS ABOUT TEACHING AND CLASROOM PRACTICES BEFORE SCHOOL EXPERIENCE

The pre-service teachers in this study had various beliefs about teaching in general and specific classroom practices. Since they were all non-native speakers going to teach English, presumably, in non-native contexts, these beliefs generally focused on teaching English as a foreign language.

APPROACH TO TEACHING AND LEARNING A FOREIGN LANGUAGE

One of the main findings of the study was related to the pre-service teachers' beliefs about teaching and learning a foreign language. Most focused on the fact that it was not an easy process. Two pre-service teachers emphasised this situation in the following ideas:

> [S1] It is known that learning a foreign language is a process that cannot be explained easily. Since many criteria decide and explain some aspects of learning foreign languages, teaching foreign languages is also not an easy job.
>
> [S3] I think teaching a foreign language is not easy because there are different students in the class, they have multiple intelligences, and some students do not like English.

This difficulty, as they stated, primarily stemmed from the fact that different students in the class might have had negative attitudes to learning a foreign language. On the other side, some other pre-service teachers believed that students needed to be informed about any aims for learning a foreign language:

> [S2] I think the main aim of learning a language is communicating and interacting in the target language. Therefore, teaching grammar is not enough for students. When I was in high school, our teachers taught us only English Grammar no other language skills such as listening or speaking skills.

These reported difficulties were also linked to their previous experiences. As [S2] stated, using a grammar-oriented approach to teaching a foreign language caused some skills such as listening and speaking to be ignored. For that reason, [S2] believed that the main aim for learning a language should be communication and interaction.

APPROACH AND METHODS IN TEACHING

The specific aims for learning a foreign language bring about specific approaches and methods in teaching that language. This belief was reflected in one of the pre-service teachers' ideas about which approach or method to use to cover the specific aims;

> [S4] It is important that the students want to learn English for what reason. For example, suppose they want to learn English for use in real life, communication, interacting with foreign people or applying it in business life. In that case, I should prepare more communicative activities and make them familiar with real-life expressions, conversations and situations such as ordering a meal, asking for an address or introducing themselves in a foreign country.

On the other hand, most pre-service teachers believe that they would develop their teaching methodology by blending all the approaches and methods they had learned. Though some of them favoured a communicative approach to language teaching, the consensus was on the notion that there was no perfect method for teaching a language. For that reason, they believed an eclectic method would be a better one:

> [S10] I would like to find my way of teaching, mixing up all the things I gathered and learned all these years. I want to teach from the heart, not from the book. The methods and techniques that I would like to use would be eclectic ones. Since there is no perfect methodology that can be applied in all lessons, I prefer using communicative and task-based language teaching.

As the pre-service teachers indicated, using only the approaches they had learned in their teacher education program was not what they preferred. The pre-service teachers believed that they needed to go beyond what had been taught to them and developed their methodologies in teaching English.

LANGUAGE USE IN THE CLASSROOM

The debate over whether language classrooms should include or exclude the students' first language while teaching a foreign language still maintains its popularity in contexts where students cannot use it outside the classroom. As the below excerpts show, the pre-service teachers in this study highlighted the importance of using the target language in the classrooms:

> [S5] I will speak English as much as possible throughout the lesson.
>
> [S6] The most important thing is that I will try not to use my first language while teaching

CLASSROOM MANAGEMENT

Classroom management as a whole was a challenging issue for many participants. Nevertheless, they had some existing beliefs about overcoming possible problems in the classroom. For instance, [S9] was in a dilemma between being strict with the students and being a lovely teacher to maintain classroom discipline, having some

questions about balancing it. Some others believed that the teacher should set some classroom rules and be open to negotiation. Excerpts below illustrate these:

> [S9] I will try to give the impression that I am a strict person but a lovely teacher at the same time. But what if I cannot show it in that way?

> [S2] There should be order and flexibility in which students feel relaxed and eager to learn. Students know how they should behave in the class. There will be some classroom rules and routines. For example, they will not come late to the class or bring their materials and books together for the course.

> [S4] In the classroom environment, I will try not to lose eye contact with the students. So, I will control the class quickly. Apart from eye contact, I will use some verbal and non-verbal warnings to keep the classroom under control. My classroom management techniques will not be strict, but I can use some punishments in the classroom if necessary. I will also try to improve myself in teaching and get a practical course session. During this process, I will be open to suggestions from the students. If they are beneficial and reasonable for the course, I can apply them.

While both [S2] and [S4] stressed the importance of some kind of control by the teacher in the classroom, or even punishments, these would be discussed with the students beforehand. The strategies they believed to be effective classroom management were related to the roles of the students in general, such as coming to the class on time with required course material, and how they used to keep the classroom under control, such as using verbal or non-verbal warnings.

APPROACH TO TEACHING GRAMMAR

Teaching grammar was one of the most frequently reported beliefs regarding teaching. Here again, the pre-service teachers had varying beliefs in their approaches to teaching grammar. While some believed that learning a language meant learning grammar, others stated that using the language for communicative purposes was more important than grammar. For instance, based on experience, [S9] stated that the way grammar had been introduced to him/her before was how it should be taught to the prospective students;

> [S9] The main rule of learning a language is to learn grammar. Based on my experiences, grammar is learned through many written and oral practices. We did not have the chance for oral practice. We learnt the grammar by doing so many written practices, and I think it worked well. I guess I will do the same thing for my students.

Some others believed that grammar should be taught using an inductive approach, leaving it for the students to discover. By exemplifying the experience, [S3] emphasised the gap between the high achievement in grammar-oriented exams and the lack of ability in speaking, and [S26] expressly referred to an inductive approach to teaching grammar.

> [S3] I do not like focusing on just grammar. As we generally focused on grammar in our education system, we could not speak English most of the time. My students should understand basic and daily things and tell their needs in English, at least. In 9th grade, all my English exams were higher than 90, yet I could not speak English.

> [S7] I am in favour of inductive grammar teaching. It is good to let students discover the grammar and encourage them to use it correctly.

STATED CHANGES IN BELIEFS AFTER SCHOOL EXPERIENCE

When the reflection papers and the forum discussions were analysed, pre-service teachers reported stability and change in their beliefs. These changes were related to questioning selves as teachers, the teaching profession in general, the use of technology in the classroom, teaching techniques, and classroom management. These are presented with excerpts from pre-service teachers' reflections below.

The significant change of beliefs of the participating pre-service teachers occurred in their questioning selves as future teachers. Most of the pre-service teachers stated that though they did not consider being a teacher before and felt hostile towards the profession; they had a positive attitude towards teaching after the school experience:

> [S3] I did not think about being a primary or secondary school teacher, but I started to think about it. I love being with children.
>
> [S10] I was a student who never wanted to be a teacher in the future, but now I realised that I was happier with those children in that classroom than in my classes. I think I did not know myself, my real ambitions, dreams and aims about what I want from life, but now it is all crystal clear.

As seen in the excerpts above, the school experience course and the experience of practising teaching, in general, changed their existing beliefs about being a teacher at specific types of schools or levels; or being a teacher at all. [S3] states that they did not consider teaching primary or secondary levels before, but after the teaching practice experience, [S3] realised that they like being with children. Similarly, seeing that the students enjoyed their lessons, [S10] stated to have changed the strict belief.

Similar to these examples, the beliefs of [S2] about the teaching profession in general also changed after experiencing the real teaching environment. It is seen in the excerpt that they considered teaching to be an easy job and thought everything could be handled with ease. However, after the school experience, [S2] felt that teaching required additional specific skills and expertise other than what they knew. The following excerpt is illustrative:

> [S2] Before this course, I always thought being a teacher was easy. But now I realise that teaching as a profession needs some special skills and expertise.

Apart from the issue of questioning self as a teacher, there were some instances where the pre-service teachers' beliefs about different aspects of classroom practices changed. For instance, in the following excerpt, the pre-service teacher had a negative attitude toward using technology in the classroom. However, after seeing how it increased students' motivations and interest in the lesson, [S1] changed this belief. Though there was no specific reference to what kind of technology was used in which activity, there was a stated change of attitude;

> [S1] I did not like computers much at the beginning of the term. However, after seeing how much they work in class, I will absolutely not think of a lesson without technology for young learners and adults.

Some participants also referred to specific teaching techniques to be used in the classroom. For instance, as seen in the following excerpt, the pre-service teacher had preferred not to use group work activities in the classroom as they were hard to manage. However, after seeing how beneficial it was for the students and that the students liked it, he/she changes this belief:

> [S3] Before practice teaching, I had thought that group work activities were hard to manage, so I did not prefer using them. I observed during practice teaching that students, especially in secondary school, were eager to work in groups. I will use group activities as much as possible, so there will be a sharing environment in the class.

Classroom management, which was one of the most cited concerns of the pre-service teachers in this study, was also subject to a change of belief. In the following excerpt, [S9] stated that after experiencing teaching in a real classroom; all their concerns disappeared:

> [S9] I always thought I could not manage a class efficiently. However, based on my teaching practice sessions, I have seen I could manage the class. I did not look as serious as I am. I was afraid of being so serious during the class that students would not be willing to participate or ask something. However, I have achieved to look happy and smiling even if I was going through the most challenging times of my life.

As the excerpt above reveals, the pre-service teacher managed to be positive in the classroom to the students in spite of an existing belief that his/her looks will be too serious for the students to participate in the lesson.

Though there were various instances of change in the pre-service teachers' beliefs, there was also an instance of stability related to the role of the students and the teachers in the classroom. In the following excerpt, the pre-service teacher pursued their pre-existing belief about student-centred learning in the classroom. However, they saw the application of a teacher-centred approach by the mentor teacher in the practising school.

> [S1] By taking all I have learned and observed into consideration, I am insistent on student-centred learning. Although all the schools where I took my education were teacher-centred and I became a somewhat successful person, it does not mean that this is the best way. I believe giving autonomy to the students and making them feel responsible for their learning is different.

By stating this, [S1] referred to the previous learning experience. Even though the teachers they came across in the previous educational life were in favour of a teacher-centred approach in the classroom, and that it did not have any role in their being successful, [S1] was still of the opinion that giving autonomy to the students was necessary to make them responsible for their learning.

5 | DISCUSSION

This study aimed to reveal the pre-existing beliefs of ten Turkish pre-service EFL teachers, their concerns and expectations about teaching and classroom practices, and track any stated changes in these beliefs. The findings suggest that pre-service EFL teachers studying at a teacher education program start the first phase of teaching experience with various pre-existing beliefs about language learning, language teaching, language use in the classroom, and classroom management caused by previous learning experiences (Lortie, 1975). Pre-service teachers have stated changes in some of their beliefs after the school experience (Brownlee et al., 2001; Hoang & Wyatt, 2021; Qui et al., 2021), both concerning their prior experiences of language learners (Yüksel & Kavanoz, 2015) as well as the curriculum of the teacher education program throughout their studies.

Some highlighted the complexity of teaching a foreign language caused by the nature of language, touching upon the learner diversity in the classroom affecting the teaching of a foreign language. Such issues arising from diversity in EFL settings have been emphasised in various forms and contexts, caused by language learning ability, language knowledge, learning styles, attitudes towards languages, motivation, interest (Ur, 1996). The pre-service teachers in this study expressly referred to negative attitudes the students in the classroom had towards English. This finding aligns with other studies that reported challenges caused by diverse classrooms affecting pre-service teachers' beliefs (Çimen & Daloğlu, 2019; Farrel, 2008; Zheng, 2009).

Another pre-existing belief was about methodology. Before the school experience, the participants reported general remarks about how to teach English, based on the courses they had taken up to that point in their studies. After the school experience, they reported that they had the chance to see the application of some classroom practices. Eilam and Poyas (2009) highlight the importance of holistic and situated classroom reality that serves as a knowledge base for pre-service teachers' professional knowledge development by stating the necessity of being "aware of the components of classroom teaching-learning episodes and their interrelations" (p. 103). In this study, while some pre-service teachers had thought that they would not use group work activities as they were believed to be hard to manage, this seemed to have changed after the school experience, seeing the application across different lessons. A similar remark about methodology was also made related to using technology in the classroom. The observation of a successful application of technology integration in the classes made pre-service teachers change their beliefs about how to use them or even consider using them (Park & Son, 2020; Teo et al., 2008). As Kılıçkaya (2009) reported, lack of modelling and familiarity (among other concerns) might cause pre-service EFL teachers to not use computer-assisted language learning (CALL) tools in their teaching practice. This particular finding obtained in this study also stresses the importance of modelling and familiarity in pre-service teachers' tendency to integrate technology in their classroom practices. Therefore, considering ways of integrating CALL into the teacher education curricula (e.g., Akayoğlu, 2017; Kılıçkaya & Seferoğlu, 2013) would help pre-service teachers to overcome this concern in their beliefs about teaching.

Classroom management was another primary concern of many pre-service teachers before the school experience, addressed in many previous studies (e.g., Stoughton, 2007; Balli, 2011; Girardet, 2018). These pre-service teachers had some pre-existing ideas and concerns about managing classroom discipline. After school experience, some reported that these concerns seemed to eradicate after seeing their strategies. From a constructivist perspective, as Girardet (2018) suggests, reflecting on prior beliefs, studying alternative practices, learning by doing, and a collaborative learning environment act as facilitators of change in pre-service teachers' beliefs specific to classroom management.

Lastly, one instance of stability was also observed in this study related to the role of students in the classroom. One pre-service teacher stated that s/he had the same belief about student-centred learning, even after the school experience. This might suggest that some beliefs are anchored knowledge, exhibiting the knowledge that is most worth and has proven itself in action (Pajares, 1992).

PEDAGOGICAL IMPLICATIONS

In this study, the participants reported a change in their professional development through their school experience. Therefore, it might be suggested that teacher education programs need to give more emphasis on such field education practices (Kasapoğlu, 2015). One of the primary goals of the school experience is to bridge the gap between theory and practice. Therefore, the theoretical coursework and micro-teachings at the universities need to be parallel with the practices at the schools. These can be enhanced with follow-up guided reflection sessions (Karakaş & Yükselir, 2020), where pre-service teachers can reflect on their observations from the school experience. Theoretical knowledge from university courses contributes to professional expertise, given that they are made explicit in such reflective practical experiences (Ur, 2019). Within this perspective, more opportunities should be created to bridge this gap between theory and practice by exposing pre-service teachers to an early practicum period (Ribaeus et al., 2020) to generate a sense of practice regarding their future profession. Pre-service teachers "need time to wrestle with professional expectations early in the programs, before they can begin to appreciate such expectations as structure for professional and personal growth" (Allsopp et al., 2006, p.31).

In the Turkish context, teacher education programs have two courses for school experience. With the latest update of New Teacher Education Programs by the Council of Higher Education (CHE) in 2018, practicum courses are now offered in the fourth (final) year of the curriculum, Teaching Practice I and Teaching Practice II. However, the organisation of these practices is generally random and left to the personal endeavour of the teacher educators and mentor teachers with outdated guidelines provided by the Council of Higher Education and World Bank in 1998 (Yükseköğretim Kurulu & World Bank, 1998). One suggestion that comes out of this study is that these practicum courses need more emphasis on addressing learner diversity in the classrooms. While this organisation of teaching practice courses requires school experience by asking pre-service teachers to visit schools, this experience can be given more importance and more space in language teacher education programs. It is seen in this study that pre-service teacher beliefs about teaching are affected negatively by the diverse classroom settings they observe, and they find difficulty in coping with different learner backgrounds, learning styles, learner intelligences, and motivation towards English. Another suggestion related to classroom management is focusing more on strategies that work rather than dealing with increased theoretical strategies that pre-service teachers cannot relate to. For this, teacher educators can support and challenge these pre-service teachers through reflective practices (Stoughton, 2007), narratives (Balli, 2011), and focusing on effective strategies of problematic behaviours rather than merely increasing the instruction in classroom management (O'Neill & Stephenson, 2012). In addition, inclusive teacher education practices (Blume et al., 2019) needs to be adopted to give way for a more contextualised practicum experience for pre-service teachers, as a socio-professional network is needed among the stakeholders of the practicum and school experience (Rakıcıoğlu-Söylemez & Eröz-Tuğa, 2014). One other significant finding was how some pre-service teachers questioned themselves as teachers before the school experience and how this questioning led to a positive outcome after the school experience. Such tensions regarding questioning selves as teachers arise in the practicum period (Flores, 2020), and exposure to these contexts bring about significant confrontations with teacher identity (Beauchamp & Thomas, 2009). A similar result is noted by Trent (2013), where such practising experiences positively shape pre-service teachers' professional identity. Therefore, acknowledging that practicum courses help pre-service teachers understand what it means to become a teacher, these courses should address increased reflective practices and collaboration among mentors, teacher educators and pre-service teachers.

6 | CONCLUSION

Teaching practice is a crucial part of pre-service language teacher education. With practicum, the pre-service EFL teachers are "introduced to the real world of teaching where they have a chance to observe experienced teachers and put their knowledge into practice" (Eröz-Tuğa, 2013, p. 1). In this study, the participants reported the significance of this real-world school experience through their reflections. The School Experience course seemed

to help the pre-service teachers to reflect upon their existing beliefs about language learning, language teaching, language use in the classroom, and classroom management. In other words, the School Experience course seems to significantly influence changing pre-service teacher beliefs (Ismail & Jarrah, 2019). This is an essential change because these pre-service teachers are on the verge of becoming teachers in different levels in different schools upon graduation; yet, they need to have a positive attitude towards teaching in general to be effective teachers.

School experience offers possibilities and opportunities for prospective teachers to gain perspectives about seeing themselves as teachers and questioning it if necessary (Chong et al., 2011). Similarly, mentor teachers at the schools need to be aware of the complexities of pre-service teachers' change process to better understand and support pre-service teachers for their transition between the classroom and field education (Archer-Kuhn et al., 2020).

The study has the following limitations. Firstly, ten pre-service teachers participated in this study. Therefore, the scope of the study is limited to these pre-service teachers only. A detailed study might be conducted with more participants. Secondly, though this study is longitudinal in that it aims to analyse two sets of data (reflection papers and forum discussions written before and after the school experience course), the school experience course involves more observation than teaching. The study might be expanded to include the reflections of the pre-service teachers written during the Teaching Practice course in the second semester, and the scope of the study might be extended to a year-long process. Lastly, further studies would include detailed interviews with the pre-service teachers about their beliefs and any stated changes.

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Examination of Preschool Children's Self-Regulation, Emotion Expressiveness and Leadership Skills

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ABSTRACT

The aim of this study is to investigate the relationship between self-regulation, emotion expressiveness, and leadership skills of preschool children. In addition, it was investigated whether or not these skills differed according to gender and the mediating role of self-regulation skills in predicting the leadership skills by emotion expressiveness characteristics of the children. The study was designed in quantitative model and correlational survey design. The sample group of the study consisted of 323 children aged 47-67 months. The data of the study were collected using Self-Regulation Skills Scale, Emotion Expressiveness Questionnaire and Early Childhood Leadership Scale. As a result of the study, leadership, self-regulation, and emotion expressiveness skills of the preschool children were found to be correlated with each other. It is found that emotion expressiveness was an important factor in terms of leadership skills of children and self-regulation skill had a determining effect in this correlation.

Keywords: Preschool period, self-regulation, emotion expressiveness, leadership.

Okul Öncesi Dönem Çocuklarının Öz Düzenleme, Duygu İfade Etme ve Liderlik Becerilerinin İncelenmesi

ÖZ

Bu çalışmanın amacı, okul öncesi dönem çocuklarının öz düzenleme, duygu ifade etme ve liderlik becerileri arasındaki ilişkiyi incelemektir. Bu genel amaç doğrultusunda, bu becerilerin cinsiyete göre farklılaşıp farklılaşmadığı ve çocukların duygu ifade etme becerilerinin liderlik becerilerini yordamada öz düzenlemenin aracı rolü araştırılmıştır. Araştırma nicel modelde olup ilişkisel tarama deseninde tasarlanmıştır. Araştırmanın örneklem grubunu 47-67 aylık 323 çocuk oluşturmuştur. Araştırmanın verileri Öz Düzenleme Becerileri Ölçeği, Duygu İfade Etme Ölçeği ve Erken Çocukluk Dönemi Liderlik Ölçeği kullanılarak elde edilmiştir. Araştırma sonucunda, okul öncesi dönem çocuklarının liderlik, öz düzenleme ve duygu ifade etme becerilerinin birbirleriyle ilişkili olduğu belirlenmiştir. Çalışmada, çocukların duygularını ifade etme becerilerinin liderlik becerileri açısından önemli bir etmen olduğu ve bu ilişkide öz düzenleme becerisinin belirleyici etkisi olduğu belirlenmiştir.

Anahtar kelimeler: Okul öncesi dönem, öz düzenleme, duygu ifade etme, liderlik.

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1 | INTRODUCTION

Leadership, described as the basic component of social interaction and a necessity for the advancement of societies, is an important social behavior for children, as well (Fu, 1979; Trawick-Smith, 1988, Trawick-Smith, 2014). Leadership can be generally defined as the process of affecting and guiding behaviors of other people under certain conditions in order to achieve personal or group goals although leadership has various definitions that may vary depending on the research areas (Koçel, 2010). Leadership studies have revealed that leadership skill continues to develop throughout the life but it starts to be acquired during early childhood years and develops significantly until the twenties as many skills (Sorcher & Brant, 2012). It is stated that the experiences in childhood years are directly correlated with leadership skills in adulthood (Schneider et al., 1999). Therefore, it is emphasized that determining and supporting leadership skills of children in early childhood years will enable individuals to be successful and efficient leaders in adulthood (Duran, 2019). It is known that the positive relationships, communication established by children with others in the early period, and especially the relationship with peers affect all development areas of children including social, emotional and cognitive areas (Bodrova et al., 2013).

The leadership characteristics shown by preschool children were first introduced by Parten (1933) and later have become the subject of many studies. According to Parten, children exhibit two types of leadership as diplomat and bully. This classification of Parten provides a perspective on the positive and negative aspects of leadership. When the literature is examined, it is seen that leadership behaviors of children are associated with prosocial behaviors. Leadership characteristics seen in children are similar to those of adults. In fact, these characteristics are seen to be extremely important in defining social competence during early childhood (Shin et al., 2004). In the studies investigating the characteristics of leader children, it is remarkable that social, cognitive and language skills of children are developed and personality traits such as imagination, independence, empathy and sensitivity remain in the forefront (Fu, 1979; Hensel, 1991; Kemple, 1991). Accordingly, it has been determined that leader children are the individuals who can communicate more easily, direct others, are sensitive to others' feelings, have different ideas, are able to generate a solution when necessary, are playmakers, have high awareness levels, are consulted by their peers and they can easily adapt to new situations (Lee et al., 2005; Shin et al., 2004). Pigors (1933) emphasized four characteristics in the leadership behaviors of children: These characteristics are social awareness, long-term goals rather than short-term goals, rapid comprehension of abstract concepts and self-control.

Self-regulation skills are required for the individual to be successful in many activities. Preschool children often need to control both their behavior and cognitive processing in order to make puzzles, build towers or play dramatic games without knowing why they want to do it (Bronson, 2019). Self-regulation is related to an individual's ability to control behaviors (Senemoğlu, 2005). Self-regulation is explained by concepts such as delaying pleasure, controlling emotions, flexibility, conscious attention and maintaining attention (Eisenberg et al., 2011). Additionally, it is expressed as an individual's cognitive, behavioral and motivational control of the learning process (Adagideli & Ader, 2014; Zimmerman, 2000).

Self-regulation reflects personal control that explains how the individual cope with the problems, crisis and situations he/she encounters in his/her plans and goals that he/she tries to realize throughout life (Sternberg & Spear-Swerling, 1998). Although the researches mostly emphasize the cognitive dimension of self-regulation, self-regulation is seen as an important factor of success in social life (Polnariev, 2006). Some studies have revealed that self-regulation in early childhood is related to various concepts and skills associated with both cognitive and social fields of development. Accordingly, it was determined that self-regulation is associated with the factors of school success and readiness (Mccelland & Tominey, 2011; Monroy, 2014), behavioral problems (Tozduman Yaralı & Güngör Aytar, 2017), game skills (Adak Özdemir & Budak, 2019; Aksoy & Tozduman Yaralı, 2017), peer relationships (Pazarbaşı & Cantez, 2019), peer rejection and academic difficulties (Eisenberg et al., 2001; Mccelland &Tominey, 2011), communication problems experienced during adolescent period (Eisenberg et al., 2004) and self-perception (Tuzcuoğlu et al., 2019) factors. For example, it was seen that children with poor self-regulation skills tend to show behavioral problems (Tozduman Yaralı & Güngör Aytar, 2017), and are less successful in peer relationships (Eisenberg et al., 2001; Eisenberg et al., 2004).

Another factor that is as effective as leadership and self-regulation skills on social developments and social interactions of preschool children is the ability to express emotions. Emotion expressiveness involves transferring the emotions that the individual experiences in different environments to another person in the most appropriate

way (Denham, 1998; Kopp, 1989). In parallel to the social emotional development of children, the ways of expressing positive and negative emotions can be shaped according to the culture, family dynamics or temperament of the child. However, the important thing is the frequency, intensity, and expressing way of negative emotions in particular. Expressing negative emotions in a way that is not suitable for the environment may both harm the adaptation of children with their environment and lead to various behavioral problems (Durmuşoğlu-Saltalı, 2010). On the other hand, it was stated that experienced but not expressed emotions are shown in different forms such as crying, tantrums, or aggression (Çağdaş & Şahin-Seçer, 2015). Therefore, emotion expressiveness plays a critical role in terms of self-regulation and leadership skills due to its function in interpersonal relationships (Southam-Gerow, 2014).

In the related literature, self-regulation is stated to be a necessity for many skills such as the ability to regulate thoughts, emotions and behaviors that the individual uses to achieve the goals he/she set (Zimmerman & Schunk, 2008). Studies on leadership (Nesbit, 2012; Pigors, 1933; Yeow & Martin, 2013) and emotion expressiveness (Ersan, 2017; Salkind, 2002) have also emphasized the importance of self-regulation. In this context, this study is seen to be important in terms of investigating the self-regulation skills of preschool children in terms of emotion expressiveness and leadership skills and determining the relationship levels between each other. Besides, in the related literature, no study was found dealing these variables together and determining the mediating roles of self-regulation in predicting leadership skills by emotion expressiveness skills. Considering all the information, it is aimed to investigate the self-regulation skills of preschool children in terms of emotion expressiveness and leadership skills. In line with this general purpose, answers for the following sub-goals were sought.

RESEARCH QUESTIONS

1. According to the gender of the children, do their

a) self-regulation skills,

b) emotion expressiveness skills,

c) leadership skills differ?

2. Is there a significant correlation between self-regulation, emotion expressiveness, and leadership skills of children?

3. Do self-regulation skills have a mediating effect in predicting the emotion expressiveness characteristics and leadership skills of children?

2 | METHOD

RESEARCH MODEL

The study, aiming at investigating the correlation between self-regulation skills, emotion expressiveness and leadership skills of the preschool children, was designed in quantitative model and correlational survey design. The study model aiming to determine the variation between two or more variables is called as the correlational survey model (Karasar, 2005).

SAMPLE GROUP

The sample group of the study was composed of 323 children attending preschool education in 2019-2020 academic year. In this study, aiming at investigating the correlations between emotion expressiveness, self-regulation, and leadership skills in preschool children, power analysis was conducted by using GPower 3.1 program firstly in order to determine the necessary sample size. For the power analysis, it was determined in the similar previous studies in the literature that the correlations between self-regulation, emotion expressiveness and leadership skills in preschool period were at medium effect level (between 0.40-0.60). Therefore, the power analysis was conducted by considering the medium effect size. As a result, the necessary sample size was determined as 115 with power of 95%, confidence interval of 95%, and significance level of 0.05 (α=0.05). Accordingly, it was targeted to reach a total of 345 children from each of Kırklareli, Ankara and Istanbul cities. Criterion sampling method was used to prepare the sample group of the study. The inclusion criteria of this study for the children were determined as follows; being aged between 48-67 months, showing normal development,

attending to any preschool education institution, and agreeing to participate in the study. Accordingly, the sample group was composed of 323 children continuing to a preschool education institution located in Kırklareli, Ankara, and Istanbul.

Table 1. Demographic Information on The Sample Group

Demographic Characteristics	Group	n	%
Gender	Girl	163	50.5
	Boy	160	49.5
Age	48-59 months	136	42.1
	60-67 months	187	57.9
School type	Private	71	22.0
	State	252	78.0
Duration of school attendance	1 year	215	66.6
	2 years	87	26.9
	3 years	21	6.5
	None	86	26.6
Number of siblings	1	132	40.9
	2	72	22.3
	3	18	5.6
	4 and more	15	4.6
Mother's working status	Employed	158	48.9
	Unemployed	165	51.1
Mother's education status	Illiterate	8	2.5
	Literate but not a primary school graduate	41	12.7
	Primary school graduate	40	12.4
	Secondary school graduate	89	27.6
	High school graduate	145	44.9
Father's education status	Literate but not a primary school graduate	19	5.9
	Primary school graduate	32	9.9
	Secondary school graduate	96	29.7
	High school graduate	176	54.5

DATA COLLECTION TOOLS

The data of the study were obtained by using Personal Information Form, Self-Regulation Skills Scale, Emotion Expressiveness Questionnaire, and Early Childhood Leadership Scale. Information about the scales is given below.

Personal information form

In the Personal Information Form developed by the researcher, it was aimed to reach the information of the child's age, gender, school type, duration of school attendance, number of siblings, mother's working status and parental education status.

Self-regulation skills scale

The scale developed by Bayındır and Ural (2016) is a 5-point Likert type scale with 33 items. According to results of the factor analysis, the scale is composed of two factors including regulation and control skills. The first factor of the scale contains 21 items and accounts for 35.23% of the variance and the second factor is composed of 12 items and accounts for 20.48% of the variance. It was found that the total explained variance was 55.71% and the item factor loads of the scale varied between .58 and .82. The Cronbach's alpha value of the scale was found as 0.96 for regulation skills factor and 0.91 for control skills factor. General reliability coefficient value was .96 and test-retest reliability value was .99. In this study, the Cronbach's Alpha coefficient of the scale was found as 0.91.

Child emotion expressiveness questionnaire

It is a measurement tool developed by Scott Mirabile (2008) and adapted to Turkish by Ersan (2017) to evaluate 36-72 month-old children's levels of expressing positive (happy) and negative (sad, angry and frightened) emotions. The Child Emotion Expressiveness Questionnaire aims to evaluate the children's ability to express their happiness, sadness, anger, and fear in terms of frequency, duration, intensity and speed. The Child Emotion Expressiveness Questionnaire is a Likert type scale rated by parents or teachers consisting of a total of 16 items including four items each for the emotions of happiness, sadness, anger and fear. High score from the scale indicates higher frequency, longer time, more intensity and higher speed for each emotion. When the frequency, time, density and speed scores obtained from the scale for each emotion are summed, positive or negative emotion expressiveness skill levels of children are obtained. In this sense, while happy emotion expressiveness reveals the "positive emotion expressiveness" skill score, sad, angry and frightened emotion expressiveness scores reveal the "negative emotion expressiveness". The scale's internal consistency is at acceptable level. The Cronbach's Alpha coefficients were calculated as .57 for sad emotion expressiveness, .85 for angry emotion expressiveness, .75 for frightened emotion expressiveness, and .76 for happy emotion expressiveness. It is also stated that there is a positive and significant correlation between sad, angry, and frightened emotion expressiveness scores ($r=.54$, $p<.001$) (Ersan, 2017).

Early childhood leadership scale

It is a measurement tool that is composed of 48 items for 48-66 month-old children and was developed by Duran (2019) to evaluate and determine the leadership characteristics of children. The scale is filled out individually for each child by the preschool teacher. It is a 5-point Likert type scale and the items are marked as "Never", "Rarely", "Sometimes", "Most of the time", and "Always". The lowest score of the scale is 48 points and the highest is 240 points. It is assumed that higher scores signify high leadership characteristics exhibited by the children and lower scores signify lower leadership characteristics. As a result of the factor analysis, the scale was determined to have a single factor structure. The internal consistency coefficient of the scale was found as .99.

PROCESS

The data of the study were collected through the scales delivered to the teachers. Personal Information Form and three scales were used. It took approximately 30 minutes for the teacher to fill the scales for each child. The scales were delivered to teachers face to face or via e-mail.

DATA ANALYSIS

The normal distribution assumption was first examined in order to decide the appropriate method to examine the significant difference status of self-regulation, emotion expressiveness and leadership skills of preschool children in terms of their gender. In the examination of normal distribution assumption, kurtosis, skewness coefficients and Kolmogorov-Smirnov test were considered. The scale scores were found to be normally distributed at gender levels. Since the gender variable has two levels, unrelated samples t-test was used. In the examination of the correlations between self-regulation skills, emotion expressiveness and leadership skills in preschool children, Pearson product-moment correlation coefficient was used since the scale scores provided the normal distribution assumption. In order to investigate the mediating effects of self-regulation skills in the prediction of leadership skills by emotion expressiveness skills of preschool children, structural equation modeling method was utilized. While conducting structural equation modeling analysis, the maximum likelihood parameter estimation method was used. Within the scope of mediator variable analysis, it was first examined if or not emotion expressiveness skills significantly predicted leadership skill in the model without mediator variable. The direct and indirect effects were then tested by taking the self-regulation skills, which were considered as the mediator, into the model.

RESEARCH ETHICS

In order to conduct the study, the permission application was made for the Ethics Committee. After obtaining the necessary permissions, interviews were made with preschool education institutions and the sample group was formed in line with the school records. Families of the children were informed about the study by sending the informed consent form. Written consents of the families who wanted to participate in the study were obtained and

it was stated that the data obtained in the application process would not be used anywhere else and the process would proceed on a voluntary basis. In order to collect the data, appropriate times were determined with the principal and teacher of the preschool education institution and the attention was paid in collecting data by conducting the visits at the determined times.

3 | FINDINGS

The status of the self-regulation skills, emotion expressiveness and leadership skills of the preschool children to show a significant difference according to gender was examined with unrelated samples T-test and the results are shown in Table 2.

Table 2. Unrelated Samples T-Test Results for Examining Self-Regulation Skills, Emotion Expressiveness and Leadership Skills of Children According to Gender

Scale	Subscale	Group	n	$\bar{X}$	ss	sd	t	p
Self-regulation Skills Scale	Regulation skills	Girl	163	86.18	12.46	321	2.772*	0.006
		Boy	160	82.85	12.81			
	Control skills	Girl	163	44.04	8.18	321	2.156*	0.032
		Boy	160	41.32	9.48			
Emotion Expressiveness Questionnaire	Positive emotion expression	Girl	163	12.74	2.14	321	0.299	0.765
		Boy	160	12.66	2.64			
	Negative emotion expression	Girl	163	27.28	8.98	321	0.473	0.637
		Boy	160	26.84	7.60			
Leadership Scale	Leadership skills	Girl	163	180.89	31.48	321	0.156*	0.032
		Boy	160	173.09	33.55			

*p<0.05

When Table 2 was examined, it was seen that the regulation skills and control skills of the children show statistically significant difference (p<0.05) according to their gender. When the mean scores were examined, the mean score of the girls was seen to be higher than boys in both regulation and control skills. According to this result, it can be said that the self-regulation skills of girls were more than boys in preschool period. It was also seen that the positive emotion expressiveness and negative emotion expressiveness skills of the children did not show a statistically significant difference (p>0.05) according to their gender. According to this result, it can be asserted that emotion expressiveness skills of the preschool children did not differ according to gender. Besides, when Table 2 was examined, it was observed that the leadership skills of children showed a statistically significant difference (p<0.05) according to gender. When the mean scores were examined, it was determined that girls had higher mean scores in leadership skills than boys. Accordingly, it can be asserted that girls in preschool period had more leadership skills than boys.

The correlation of the self-regulation skills with leadership skills and emotion expressiveness skills of children in preschool period was calculated with Pearson's correlation coefficient. Table 3 shows the results.

Table 3. Results of Pearson's Correlation Coefficient Analysis Regarding the Investigation of the Correlation of Self-Regulation Skills with Leadership Skills and Emotion Expressiveness Skills of the Children

Self-Regulation skills		Positive emotion expression	Negative emotion expression	Leadership
Regulation skills	r	0.456*	-0.212*	0.675*
	p	0.000	0.000	0.000
Control skills	r	0.145*	-0.296*	0.424*
	p	0.009	0.000	0.000

*p<0.05

When Table 3 was examined, it was seen that there was a positive statistically significant correlation between self-regulation skills and positive emotion expression skills and leadership skills of the children (r = 0.456; 0.675; p<0.05). Accordingly, it can be asserted that the positive emotion expressions and leadership skills of children increased as their self-regulation skills increased. A negative and low level statistically significant correlation was found between the regulation skills factor of self-regulation skills scale and negative emotion expression (r =-0.212; p<0.05). A positive, low level statistically significant correlation between positive emotion expression and control skills, another factor of self-regulation skills scale (r = 0.145; p<0.05) and a positive and moderate statistically significant correlation between control skill and leadership skill (r = 0.424, p<0.05) were determined. Accordingly, it can be asserted that positive emotion expression skills and leadership skills increased as the control skills increased. It was determined that there was a negative, low and statistically significant correlation between control skill and negative emotion regulation skill (r = -0.296; p<0.05).

In order to determine the mediating effects of self-regulation skills in the prediction of leadership skills by emotion expressiveness skills of the preschool children, structural equation modeling method was utilized. Since emotion expressiveness skills have two subscales including positive emotion expression and negative emotion expression and emotion regulation has two subscales including regulation skill and control skill, four different mediator models have been established. Figure 1 shows the path diagrams taken by the standard path coefficients of these models. Table 4 shows the path coefficients obtained when mediator variable was and was not added as well as standard error values.

Table 4. Examining the Mediating Role of Self-Regulation Skill in Predicting Leadership Skills by Emotion Expressiveness Skills of the Children

	Paths	Std. Path Coefficient (β)	Std. Error (Sβ)	p
No mediator variable	Positive emotion expression -> Leadership	0.550	0.634	<0.05
	Negative emotion expression -> Leadership	-0.289	0.210	<0.05
Model 1	Positive emotion expression -> Regulation skill (Direct effect)	0.456	0.263	<0.05
	Regulation skill -> Leadership (Direct effect)	0.535	0.110	<0.05
	Positive emotion expression -> Leadership (Direct effect)	0.306	0.586	<0.05
	Positive emotion expression -> Regulation skill-> Leadership (Indirect effect)	0.244		
Model 2	Positive emotion expression -> Control skill (Direct effect)	0.145	0.206	<0.05
	Control skill -> Leadership (Direct effect)	0.352	0.583	<0.05
	Positive emotion expression -> Leadership (Direct effect)	0.499	0.156	<0.05
	Positive emotion expression -> Control -> Leadership (Indirect effect)	0.051		
Model 3	Negative emotion expression -> Regulation skill (Direct effect)	-0.212	0.083	<0.05
	Regulation skill -> Leadership (Direct effect)	-0.152	0.162	<0.05
	Negative emotion expression -> Leadership (Direct effect)	0.642	0.106	<0.05
	Negative emotion expression -> Regulation skill-> Leadership (Indirect effect)	-0.136		
Model 4	Negative emotion expression -> Control skill (Direct effect)	-0.296	0.057	<0.05
	Control skill -> Leadership (Direct effect)	0.371	0.190	<0.05
	Negative emotion expression -> Leadership (Direct effect)	-0.179	0.204	<0.05
	Negative emotion expression -> Control -> Leadership (Indirect effect)	-0.110		

When Table 4 was examined, it was observed that positive emotion expression positively and significantly predicted the leadership skills of the children when the mediator variable was not included in the model (β=0.550; p<0.05; R2= 0.30). Accordingly, leadership skill increased as positive emotion expression increased. In model 1, where regulation skills were taken as a mediator variable in predicting leadership skill by positive emotion expression, it was determined that positive emotion expression positively and significantly predicted the regulation skills (β=0.456; p<0.05; R2= 0.21) and regulation skills positively and significantly predicted the leadership skills (β=0.535; p<0.05; R2= 0.29). In model 1, positive emotion expression positively and significantly predicted the leadership skill (β=0.306; p<0.05; R2= 0.09). As seen in the Table, when the regulation skills were added as a mediator variable, the correlation between positive emotion expression and leadership skill decreased. The path coefficient for predicting leadership skill by indirect effect of positive emotion expression in regulation skill was found as 0.244. While positive emotion expression statistically significantly predicted regulation skill and regulation skill in turn statistically significantly predicted the leadership, status of positive emotion expression to predict leadership continued its significance; therefore, it can be asserted that regulation skills played a partial mediator role in effect of positive emotion expression in leadership skill.

In model 2, control skills were taken as a mediator variable in the prediction of leadership skill by positive emotion expression. It was determined that positive emotion expressions positively and significantly predicted the control skills (β=0.145; p<0.05; R2= 0.02) and control skills positively and significantly predicted the leadership skills (β=0.352; p<0.05; R2= 0.12). In model 2, positive emotion expression positively and significantly predicted the leadership skill (β=0.499; p<0.05; R2= 0.25). As seen in the table, when the control skills were added as a mediator variable, the correlation between positive emotion expression and leadership skill decreased. The path coefficient regarding the prediction of leadership skill by indirect effect of positive emotion expression in control skills was found as 0.051. While positive emotion expression predicted the control skills and control skills predicted leadership statistically significantly, positive emotion expression continued its significance status of predicting leadership, thus it can be interpreted that control skills played a partial mediator role in the effect of positive emotion expression in leadership skill.

When Table 4 was examined negative emotion expression was seen to be negatively and significantly predict the leadership skills of children (β= -0.289; p<0.05; R2= 0.08), when the mediator variable was not included in the model. In other words, leadership skill decreased as negative emotion expression increased. In model 3, where regulation skills were taken as mediator variable in the prediction of leadership skill by negative emotion expression, it was determined that positive emotion expression negatively and significantly predict the regulation skills (β= -0.212; p<0.05; R2= 0.04) and regulation skills negatively and significantly predicted the leadership skills (β=-0,152; p<0.05; R2= 0.41). In model 3, negative emotion expression positively and significantly predicted the leadership skill (β= 0,642; p<0.05; R2= 0.02). As seen in the table, when regulation skills were added as a mediator variable, the correlation between negative emotion expression and leadership skill decreased with absolute value. The path coefficient regarding the prediction of leadership skill by indirect effects of negative emotion expression in regulation skill was found as -0.136. While negative emotion expression predicted self-regulation and self-regulation, in turn, predicted the leadership statistically significantly, status of negative emotion expression to predict leadership maintained its significance; therefore, it can be asserted that regulation skills played a partial mediator role in the effect of negative emotion expression in leadership skill.

In model 4, control skills were taken as a mediator variable in the prediction of leadership skill by negative emotion expression. It was determined that negative emotion expressions negatively and significantly predicted the control skills (β= -0.296; p<0.05; R2= 0.09) and control skills positively and significantly predicted the leadership skills (β=0.371; p<0.05; R2= 0.14). In model 4, negative emotion expression negatively and significantly predicted leadership skill (β= -0.179; p<0.05; R2= 0.03). As seen in the table, when the control skills were added as a mediator variable, the correlation between negative emotion expression and leadership skill decreased with absolute value. The path coefficient regarding the prediction of leadership skill by indirect effect of negative emotion expression in control skill was found as -0.110. While negative emotion expression predicted control skills and control skills predicted the leadership statistically significantly, status of negative emotion expression to predict leadership maintained its significance. Thus, it can be asserted that control skills played a partial mediator role in the effect of negative emotion expression in leadership skill.

The path diagram taken by the standard path coefficient of four different mediator models is given as follows.

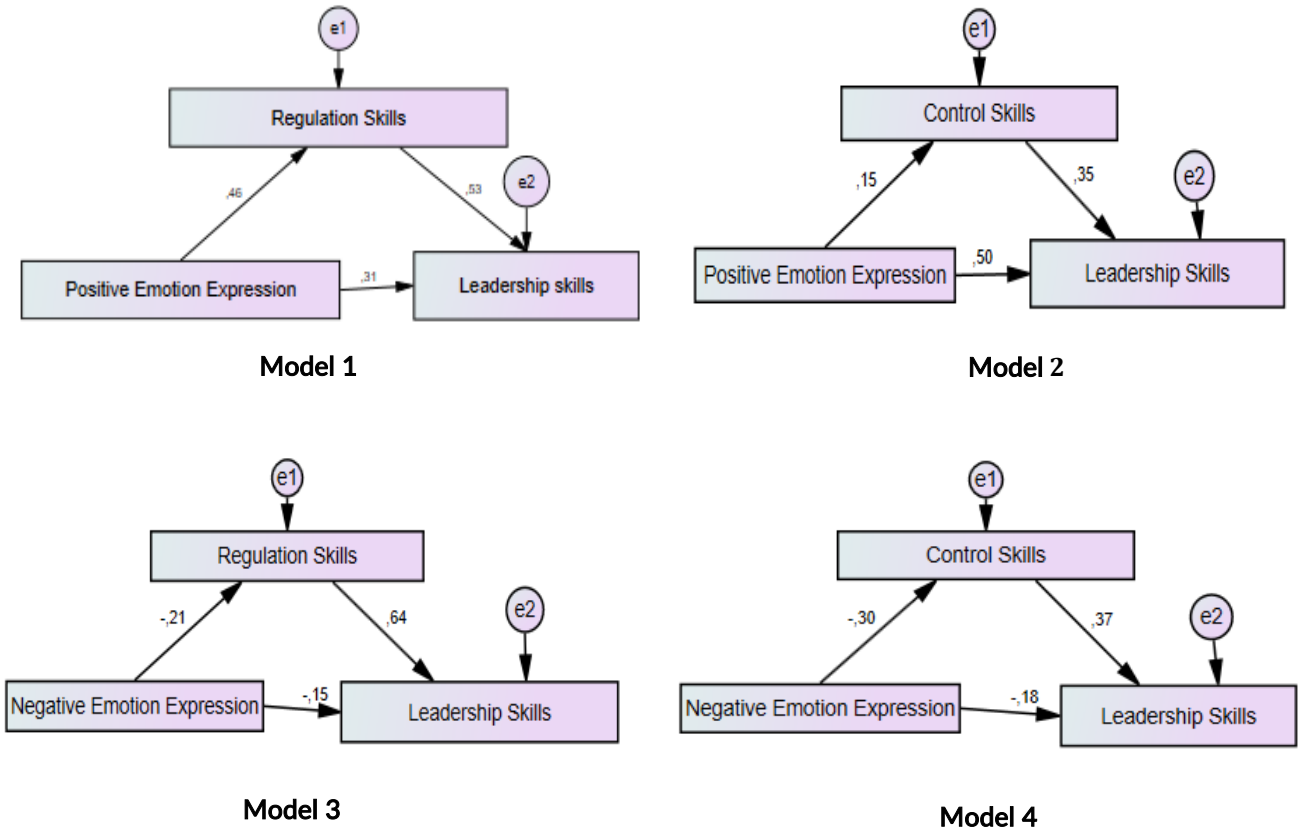

Figure 1. *Path Diagram Showing the Mediator Role of Self-Regulation Skill in Predicting Leadership Skills by Emotion Expressiveness Skills of the Children*

4 | Discussion & Conclusion

When development is considered as a whole, development fields are seen to interact with many factors. Knowing the factors affecting leadership, which is an important skill in the social development process, will enable to know children more accurately. Accordingly, the main goal of the study is to investigate the relationship between self-regulation, emotion expressiveness, and leadership skills of preschool children. In addition, it was investigated whether or not these skills differed according to gender and the mediating role of self-regulation skills in predicting the leadership skills by emotion expressiveness characteristics of the children.

Within the purpose of study, it was found that the self-regulation and leadership skills of children differed in terms of their gender, but emotion expressiveness did not differ based on gender. Accordingly, it was found that girls had a higher score in self-regulation and leadership skills compared to boys. Similar to the present study, Duran (2019) found in his study that leadership scores of girls were significantly higher than that of boys in terms of leadership skills. It is believed that gender role might have an effect on this result. It is seen that leadership behaviors of children are associated with prosocial behavior. In fact, it has been stated that these behaviors are extremely important in defining social competence in early childhood (Shin et al., 2004). The studies have also revealed that girls exhibit more prosocial behaviors than boys (Bağcı Çetin & Öztürk Samur, 2018). Therefore, it can be asserted that these behavioral characteristics explain why girls had a higher score in leadership skills than boys. When the literature about self-regulation skill is examined, it is revealed that self-regulation skills of girls are more advanced than boys (Aksoy & Tozduman Yaralı, 2017; Kochansha et al., 1997; Raffaelli et al., 2005). Therefore, the fact that the self-regulation skills are more advanced in girls than boys in the studies is in parallel with the results of the present study. In the study conducted by Ersan (2017) it was determined that aggression levels of preschool children were higher in boys compared to girls. Accordingly, a negative and significant correlation was found between aggression level and emotion expressiveness skills. Although no significant

difference was found between emotion expressiveness skills of girls and boys in the results of this study, it can be expressed that the emotion expressiveness skills of children would decrease the undesired behavior and contribute to the development of leadership skills by considering that the emotion expressiveness scores were higher in girls than boys, (Blandon et al., 2010).

One of the most important findings of the study is that there is a significant correlation between leadership, emotion expressiveness and self-regulation skills of the preschool children. On the other hand, it was found that while emotion expressiveness predicted the leadership skills of children, self-regulation played a mediator role in leadership skills. When the literature on self-regulation and leadership is examined, the determination of self-regulation on leadership is emphasized in parallel with the results of the study (Nesbit, 2012; Pigors, 1933; Yeow & Martin, 2013). Yeow and Mertin (2013) stated that interventions for self-regulation played a mediator role for leaders in achieving the duty-related qualifications. It is emphasized that other than individual dimension, self-regulation is an important factor of the social life (Polnariev, 2006). In fact, undeveloped self-regulation skills can cause behavioral problems and in turn behavioral problems can lead to peer conflict and negative teacher-child relationships. It is known that children with poor self-regulation skills experience peer rejection and academic difficulties (Eisenberg et al., 2001; Mccelland & Tominey, 2011; Montroy et al., 2014). It is seen that children, who have insufficient preventive control skills, high reaction levels and can be hardly controlled in preschool period, experience problems in expressing themselves in social processes during adolescence period (Eisenberg et al., 2011). In this respect, the results of the studies related to self-regulation have showed that self-regulation is an important determinant in terms of leadership skills.

In this context, Southam-Gerow (2014) emphasize the functionality of emotions in interpersonal relations and states that they have a motivating role in regulating the relationship with people and objects and being preventive. Therefore, considering that the leader children are individuals who communicate more easily, direct others, are sensitive to the feelings of others, have different ideas, can find solution when necessary, are playmaker, have high awareness levels, are consulted by their peers and they adapt easily to new situation, and regulate their social interactions with their peers (Hazen & Black, 1989; Lee et al., 2005; Shin et al., 2004; Trawick-Smith, 1988), the determinative effect of emotion expressiveness on leadership draws attention. In addition, it was determined that children with leadership skills in terms of importance of emotion expressiveness could establish relationship with their peers and teachers and maintain the relationship they establish positively (Shin et al., 2004). Along with the current literature, the results of the study indicated that emotion expressiveness and self-regulation skills are important for leadership behaviors in children.

The results of the study indicated that leadership, self-regulation and emotion expressiveness skills of preschool children were associated with each other. Emotion expressiveness for children is an important factor in terms of leadership skills and self-regulation skill has a determining effect in this relationship. In this context, activities on supporting emotion expressiveness, leadership, and self-regulation skills of children in early childhood education programs can be emphasized. Although the study makes contributions to the literature both theoretically and practically, some of its limitations can be addressed in future studies. Since this study was conducted with quantitative method, only numerical values were included in the study results. In the future studies, in-depth studies can be planned using different methods like qualitative and mixed ones.

STATEMENTS OF PUBLICATION ETHICS

We declare that the study has no unethical problems and ethics committee approval was obtained from Kırklareli University, Kırklareli (Place: Kırklareli University, Date: 23.06.2020 Number: 69456409-199-E 9123).

RESEARCHERS' CONTRIBUTION RATE

The authors involved in the research contributed equally.

CONFLICT OF INTEREST

This study has not any conflict of interest.

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Trends of Postgraduate Theses Conducted in the Field of Science Education on Biotechnological Concepts in Turkey for the Last 20 Years: A Content Analysis

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ABSTRACT

This study presents a descriptive content analysis of the research trends of postgraduate theses conducted in the field of science education on biotechnological concepts in Turkey between 2000-2020. In line with the aim of the study, 65 postgraduate theses in total were examined by searching the database of the Council of Higher Education (CoHE) National Thesis Center. In this study using document analysis, one of the qualitative research designs, theses were analyzed according to years, universities, study subjects, concepts, methods, data collection tools, sampling, and sample size. The results showed that theses were predominantly master's theses, postgraduate theses conducted in the field of science education on biotechnological concepts were carried out in a total of 27 universities, and theses were mainly conducted at Gazi University, Inonu University, and Bolu Abant Izzet Baysal University. Regarding the subject distribution, it was seen that theses were mainly written on the attitudes, perceptions, and interests of middle school, high school, and university students and teachers concerning biotechnology and were teaching- and learning-oriented. Furthermore, it was concluded that quantitative approaches were mostly used in the examined theses, and experimental designs among quantitative research methods were preferred more than non-experimental designs. As data collection tools, mostly skill, attitude, perception, personality, etc. tests, achievement tests, Likert-type questionnaires, and semi-structured interviews were used, and it was observed that the most preferred sample group was university and high school students and the sample size was mostly between 101-300 and 31-100. Based on the study results, it can be suggested that researchers conduct more studies on biotechnology-related subjects using different samples and scales.

Keywords: Biotechnology education, content analysis, postgraduate theses, document analysis.

Türkiye'de Biyoteknolojik kavramlarla ilişkili Fen Bilimleri Eğitimi Alanında Lisansüstü Tezlerin son 20 yıllık eğilimleri: Bir İçerik Analizi

ÖZ

Bu çalışma, Türkiye'de 2000-2020 yılları arasında biyoteknoloji kavramına yönelik fen bilimleri eğitimi alanında yapılan lisansüstü tezlerin araştırma eğilimlerine yönelik, açıklayıcı içerik analizini sunmaktadır. Çalışma kapsamında Yükseköğretim Kurulu (YÖK) Ulusal Tez Merkezi veritabanı taranarak toplamda 65 lisansüstü tez incelenmiştir. Nitel araştırma desenlerinden doküman incelemesinin kullanıldığı bu çalışmada tezler yıllara, üniversitelere, çalışma konularına, kullanılan kavramlara, yönteme, very toplama araçlarına, örnekleme ve örneklem büyüklüğüne göre analiz edilmiştir. Bulgulardan elde edilen sonuçlara göre tezlerin ağırlıklı olarak yüksek lisans tezi olduğu, biyoteknolojik kavramlarla ilişkili fen eğitimi alanında yapılmış lisansüstü tezlerin toplam 27 üniversitede gerçekleştirildiği ve tezlerin ağırlıklı olarak Gazi Üniversitesi, İnönü Üniversitesi ve Bolu Abant İzzet Baysal Üniversite'nde yapıldığı görülmüştür. Konu dağılımına göre tezlerin ağırlıklı olarak, ortaokul, lise ve üniversite öğrencileri ile öğretmenlerin biyoteknolojiye yönelik tutum, algı ve ilgileri üzerine yapılarak öğretim ve öğrenme odaklı olduğu, görülmüştür. Ayrıca incelenen tezlerde çoğunlukla nicel yaklaşımların kullanıldığı, nicel araştırma yöntemlerinden deneysel desenlerin deneysel olmayan desenlere oranla daha çok tercihedildiği sonucuna ulaşılmıştır. Veri toplama araçları olarak çoğunlukla yetenek, tutum, algı, kişilik vb. testleri, başarı testleri, likert türü anketler ve yarıyapılandırılmış görüşmelerin kullanıldığı, en çok tercih edilen örneklem grubunun üniversite ve lise öğrencileri olduğu ve örneklem büyüklüğünün çoğunlukla 101-300 ve 31-100 aralığında olduğu görülmüştür. Çalışma sonuçlarından yola çıkarak araştırmacılara biyoteknoloji ile ilgili konularda farklı örneklemler ve ölçekler kullanarak daha çok çalışma yapmaları önerilebilir.

Anahtar kelimeler: Biyoteknoloji eğitimi, içerik analizi, lisansüstü tezler, doküman analizi .

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1 | INTRODUCTION

Developments in the field of biotechnology are undoubtedly one of the most important scientific and technological developments of the 21st century. Nowadays, many biotechnological studies are carried out with applications such as the Human Genome Project, genetic replication, and gene therapy to find solutions to agricultural problems with genetically modified organisms ensuring the production of plant and animal breeds and products resistant to unfavorable conditions and having increased shelf life and nutritional value and to environmental problems using biological tools and systems, biological fuel and renewable energy sources.

Although archaeological evidence shows that biotechnological applications began with plant and animal breeding about 10 thousand years ago, the term biotechnology was first used by the Hungarian scientist Karl Ereky in 1919. However, it is known that developments affecting human life more in the field of biotechnology started with the discovery of restriction enzymes in the 1970s, following the discovery of the double helix structure of DNA in 1953. These discoveries initiated the modern age of biotechnology and resulted in the introduction of biotechnological developments in many fields, such as health, agriculture, food, and the environment, into human life. Therefore, biotechnology, together with information technology, is one of the scientific developments expected to make the most significant contribution to the welfare of humanity in the last quarter of the 20th century and the 21st century.

The multidisciplinary and complex nature of biotechnology poses difficulties for the society trying to learn this discipline and for science educators trying to teach it. Additionally, with the rapid development of this technology, different benefits and risks emerge every day, and the information and discussions on this subject gain more importance in our lives. In line with these developments and difficulties, the necessity and importance of providing biotechnology education in schools arise (Hanegan & Bigler, 2009; Steele & Aubusson, 2004).

The general objectives of science education include teaching science concepts that form the basis of advancements in science and technology and enabling individuals to be science literate at a level to follow these developments and understand their impact on social life (Albe, 2008; Kolsto, 2006; Nielsen, 2012; Walker & Zeidler, 2007). The science curriculum needs to adapt to change due to the constantly developing and updating structure of scientific and technological discoveries. In parallel with recent scientific developments, the science course curriculum in Turkey was also updated many times. Upon examining the related education programs for elementary school in Turkey, it was seen that the foundations of biotechnology and genetic engineering education were tried to be laid (Darcın, 2003). The studies conducted on biotechnology education have emphasized that programs at all levels of education should include a wide range of accurate information, especially for the use of biotechnology in daily life, and science teachers should be knowledgeable and equipped on these issues (France, 2000; Marchant & Marchant, 1999; Olsher & Dreyfus, 1999; Thomas, Keirle, & Griffith, 2002; as cited in Darcın, 2007).

According to some studies in the international literature, teachers do not devote much time to biotechnology in their lessons (Fonseca, Costa, Lencastre & Tavares, 2011; Steele & Aubusson, 2004), and students have preconceptions that biotechnology is difficult (Steele & Aubusson, 2004). It is also known that students are unwilling to learn biotechnology, possibly for this reason (Kidman, 2009). Likewise, it is stated that teachers have negative perceptions and beliefs about biotechnology (France, 2007). A study by Lamanauskas, Makarskaite-Petkevičienė (2008) revealed that pre-service teachers had low levels of knowledge about biotechnology, their attitudes toward the use of genetically modified foods were negative, and they believed that DNA manipulations were unethical. Researchers argue that one of the most important factors influencing attitude toward biotechnology applications is gender, and some studies have concluded that men have more positive attitudes toward biotechnology applications than women (Moerbeek & Casimir, 2005; Prokop et al., 2007; Qin & Brown, 2007).

THE PURPOSE AND SIGNIFICANCE OF THE STUDY

While it is a known fact that the correct way to teach developments in biotechnology and genetic engineering is through educational institutions and formal education, there are few studies conducted with teachers currently working in Turkey. In these studies, it has been observed that teachers have sufficient knowledge about the definitions of concepts such as biotechnology applications and genetically modified organisms (GMOs). However, it has been determined that they do not have sufficient and consistent knowledge and equipment about such

applications in daily life (Aksoy, 2006; Çiçekci, 2008; Demirci, 2008; Gurkan & Kahraman, 2018; Senler, Kozcu Cakır, Gorecek & Gocmen Taskın, 2006). A study conducted by Ocal (2012) with science teachers revealed that they generally learned biotechnological developments from the media and the internet, not from educational institutions. Considering that the information obtained through the internet is mostly not valid and correct, this situation may cause the adoption of false ideas and prejudice against such a socioscientific issue due to the misinformation in the media (Aydin & Cetin, 2020). Studies conducted with students on biotechnological concepts in Turkey have examined the attitudes and knowledge levels of primary and middle school students and university students studying in various departments. According to the results obtained from these studies, conducting biotechnology lessons with laboratory support leads to a positive change in success and attitude (Darcın, 2007). Students' attitudes toward biotechnology may differ depending on variables such as knowledge level, gender, and class level (Balemen, 2009; Darçın, 2011; Turkmen & Darcın, 2007). The fact that pre-service teachers have taken a course on biotechnology before coming to the university and during their undergraduate education positively affects their knowledge and attitudes (Yuce & Yalcın, 2012).

The education that societies receive in the field of biotechnology and genetic engineering, their knowledge and their academic studies will determine whether they will have a say in shaping this area of the future world. Therefore, it is very important to determine whether the education provided in this field and whether the status of the field are sufficient and reveal the problems in education (Sıcaker & Ozaydin, 2015). The wide range of studies on biotechnology education in terms of subject context and the continuous increase in the number of studies make it difficult to follow the literature. When the relevant literature is reviewed, no study has been found analyzing research conducted in the field of science education in Turkey on biotechnology education to determine the trends in terms of various factors.

However, to look at the subject holistically, provide explanatory information about the position of biotechnology education in our country, and thus direct future research, it is necessary to determine what kind of studies are carried out in the literature and what deficiencies this field has.

RESEARCH QUESTIONS

This study investigated the status and trends of nationally conducted postgraduate thesis studies on the use of biotechnology and related concepts in science education. To this end, the postgraduate theses in the field of science education, including biotechnological concepts, which were registered to the CoHE National Thesis Center between 2000 and 2020, were analyzed descriptively to answer the following questions:

1. What is the distribution of theses by years and types?
2. What is the distribution of theses by the universities where they were conducted?
3. What is the distribution of theses by study subjects?
4. Which research methods were used in theses?
5. What is the distribution of the sample group used in theses?
6. What is the size of the sample groups used in theses?
7. Which data collection tools were used in theses?
8. Which data analysis methods were used in theses?

The current study aims to provide researchers working in the field of biotechnology education with the opportunity to view postgraduate theses in a single resource and provide researchers with information about study trends in the field. It is thought that revealing the trends in the literature will also be useful in determining the path that researchers will follow in their studies by shedding light on what deficiencies are and generating ideas to fill gaps in the literature. The fact that this study was limited to postgraduate thesis studies in science education and its implementation in a more specific area helped to conduct a detailed study.

2 | METHOD

RESEARCH MODEL

A qualitative research model was used in this study. Qualitative research is a research method in which "the qualitative process is followed to reveal perceptions and events in a realistic and holistic manner in the natural environment" (Yıldırım & Simsek, 2008). In this study, the research trends of postgraduate theses conducted in our country in the field of science between 2000-2020 on the concept of biotechnology were revealed by a content analysis method based on document analysis. Content analysis, a qualitative method, is defined as the process of examining the contents and information of previously published written and other materials within the framework of objective and certain systematic criteria (Cohen, Manion & Morrison, 2007; Tavsancıl & Aslan, 2001).

DATA COLLECTION

In addition to science education, biology education, and chemistry education, which include concepts related to biotechnology in their curricula, this study also focused on postgraduate thesis studies in the fields of classroom and preschool education due to the biotechnological concepts in their curricula. Furthermore, while the research was conducted in the fields mentioned above, the study was limited to theses conducted in the field of education and teaching biotechnology-related concepts. The related postgraduate thesis studies were reached by searching in the CoHE National Thesis Center. The keywords "biotechnology," "genetic engineering," "cloning/copying," "genetically modified organisms (GMO)," "genome project," and "recombinant DNA" were used in the search. The search was repeated in a way to cover the title, abstract, keywords, and text parts of graduate theses. Thus, it was tried to reach not only the title but also all postgraduate thesis studies that include biotechnology and concepts related to its content. Within the scope of the study, 65 postgraduate theses (Appendix 1), registered in the CoHE National Thesis Center, published between 2000-2020 and whose full texts could be accessed, were analyzed. Since studies on biotechnology, especially in the field of education, started in the 2000s, this study examined theses published since 2000.

DATA ANALYSIS

A thesis classification form was created using similar thesis survey forms in the literature for 65 postgraduate theses that were reached according to the search results and met the study's criteria. First, the information on postgraduate theses (author names, year, language), then the purpose and method information (study design, sample, data collection, and analysis methods) and the results obtained from the findings were recorded in this file.

The full texts of the postgraduate theses included in the study were repeatedly examined, and codes and themes were created in accordance with the research questions. During the coding process, the relevant parts of each thesis were read in detail, and similar studies in the literature were reviewed and identified. The codes that were categorized afterward were gathered under similar themes. To avoid data confusion, each thesis examined in the study was coded as 1, 2, ……., 65. It was reviewed whether the categories and codes created were compatible with each other, and it was seen that the researchers agreed on the majority of them.

Reliability in this study was tried to be ensured with transferability, consistency, and verifiability criteria. To ensure transferability, a detailed description method was used by explaining the criteria for determining the studies included in the study, the processes of collecting data, coding and creating themes. For consistency, the data were used as contained in the theses, without adding comments. To avoid bias in the data analysis, codes and themes were created using similar studies in the literature. The list of the reviewed studies was presented for verifiability, and the analyses were archived to be presented when requested. The values obtained from the analysis were digitized for each category as frequency values. Digitizing the data is important in terms of the reliability of the research and providing the opportunity to compare the findings if the research is repeated (Yıldırım & Şimşek, 2008).

3 | FINDINGS

The study was carried out in the field of science education by reaching the full versions of postgraduate theses in the CoHE National Thesis Center. Table 1 shows the distribution of the postgraduate theses on biotechnological concepts by years and types in terms of frequency and %. As seen in Table 1, there was no thesis study conducted on the subject in 2000 in Turkey, and the first thesis was written in 2001 as a master's thesis. There was a gradual increase in theses in the following years, and a more significant increase was experienced after 2010. Moreover, it was determined that the first doctoral dissertation on biotechnological concepts was written in 2005. It is remarkable that the majority of the 65 theses reached and analyzed (f = 55) were master's theses and only a very small part (f = 10) were doctoral dissertations. The highest number of thesis studies was conducted in 2019 when a total of 9 theses (8 master's + 1 Ph.D.) were done.

Table 1. Distribution of the theses examined by years and types

Years	Master Thesis		PhD Thesis		Total	
	f	%	f	%	f	%
2000	-	-	-	-	-	-
2001	1	1.8	-	-	1	1.5
2002	1	1.8	-	-	1	1.5
2003	2	3.6	-	-	2	3.1
2004	1	1.8	-	-	1	1.5
2005	2	3.6	1	10	3	4.6
2006	2	3.6	-	-	2	3.1
2007	1	1.8	1	10	2	3.1
2008	1	1.8	1	10	2	3.1
2009	5	9.1	-	-	5	7.7
2010	2	3.6	-	-	2	3.1
2011	2	3.6	1	10	3	4.6
2012	4	7.3	1	10	5	7.7
2013	6	10.9	-	-	6	9.2
2014	1	1.8	1	10	2	3.1
2015	3	5.5	1	10	4	6.2
2016	2	3.6	1	10	3	4.6
2017	4	7.3	-	-	4	6.2
2018	3	5.5	-	-	3	4.6
2019	8	14.6	1	10	9	13.8
2020	4	7.3	1	10	5	7.7
Total	55	100	10	100	65	100

Table 2 shows the data regarding the distribution of the universities where the theses were conducted. Upon examining the data in Table 2, it is noteworthy that postgraduate theses conducted on biotechnological concepts and in the field of science education in Turkey were carried out in 27 universities, and approximately one-third of these theses were conducted at Gazi University. In the last two decades, 19 postgraduate theses on biotechnological concepts in the field of science education were written at Gazi University. Following Gazi University, the universities with the highest number of theses on this subject were Bolu Abant Izzet Baysal University and Inonu University, with four theses each.

Table 2. Distribution of the examined theses on biotechnological concepts by universities

Rank	Universities	*f*	%
1	Adiyaman University	1	1.5
2	Ahi Evran University	1	1.5
3	Aksaray University	2	3.1
4	Ankara University	1	1.5
5	Aydın Adnan Menderes University	1	1.5
6	Balıkesir University	3	4.6
7	Bolu Abant Izzet Baysal University	4	6.2
8	Canakkale Onsekiz Mart University	1	1.5
9	Cukurova University	2	3.1
10	Dicle University	1	1.5
11	Dokuz Eylul University	2	3.1
12	Eskisehir Teknik University	1	1.5
13	Fatih University	2	3.1
14	Gazi University	19	29.2
15	Giresun University	1	1.5
16	Hacettepe University	2	3.1
17	Inonu University	4	6.2
18	Kafkas University	1	1.5
19	Karadeniz Teknik University	2	3.1
20	Kastamonu University	2	3.1
21	Marmara University	2	3.1
22	Mugla Sıtkı Kocman University	3	4.6
23	Necmettin Erbakan University	2	3.1
24	Ondokuz Mayıs University	1	1.5
25	Pamukkale University	1	1.5
26	Selcuk University	2	3.1
27	Suleyman Demirel University	1	1.5
	Total	65	100

Table 3 shows the distribution of postgraduate theses on biotechnological concepts by study subjects, which were conducted in the field of science education between 2000 and 2020 in Turkey. As seen in Table 3, thesis studies were frequently conducted in the field of learning (f = 44; 30.2%). It was observed that the theses conducted in the field of learning include the sub-study subjects of determining the level of knowledge/achievement (f=33; 22.6%), conceptual understanding/learning (f=7; 4.8%), meaningful and permanent learning (f=2; 1.4%), and the need for information/ways of obtaining information (f=2; 1.4%). While attitude/perception/interest (f=37; 25.3%) study subjects take the second place among the study subjects of postgraduate theses on biotechnological concepts, the subject of teaching (f=28; 19.1%) study is in the third place. The least studied subject was determined to be purchase intention (f = 1; 0.7%).

Table 3. Distribution of the examined theses on biotechnological concepts by study subjects

Subject	Sub Study Subject	*f*	%
Learning Teory/Approach	Knowledge/Achievement	33	22.6
	Conceptual Understanding/Learning	7	4.8
	Meaningful and Permanent Learning	2	1.4
	Need for Information Ways of Gaining Information	2	1.4
	Total	44	30.2
Attitude/Perception/ Interest	Attitude	27	18.5
	Perception/Perception of Risk	6	4.1
	Interest	4	2.7
	Total	37	25.3
Teaching	Methods and Techniques	24	16.4
	Program/Material Design/ Investigation	4	2.7
	Total	28	19.1
Skill	Argumentation	5	3.4
	Critical Thinking	1	0.7
	Empathy Skill	1	0.7
	Informal Reasoning	1	0.7
	Total	8	5.5
Belief	Self-efficacy	4	2.7
	Epistemological Belief	1	0.7
	Total	5	3.4
Opinion/Thought		10	6.9
Bioethics/Values		5	3.4
Relationship		4	2.7
Scale Development		2	1.4
Scientific Literacy/The Nature of Science		2	1.4
Purchase Intention		1	0.7
	Total	146	100

In addition to the data in Table 3 regarding the study subjects of the theses, the content analysis findings regarding which biotechnological concepts were studied in the examined theses are presented in Table 4. As seen in Table 4, the concepts of biotechnology (f = 34, 45.4%) and/or biotechnology applications were mostly preferred when choosing the study subject in theses. Following the concept of biotechnology, thesis studies were conducted mostly on the concepts of GMO (f = 21, 28%) and genetic engineering (f = 10, 13.4%).

Table 4. Distribution of biotechnology-related concepts used in postgraduate theses

Biotechnological Concept	*f*	%
Biotechnology / Biotechnological Applications	34	45.4
Genetically Modified Organisms (GMO)	21	28
Genetic Engineering	10	13.4
Cloning	6	8
Human Genome Project	1	1.3
Biosecurity	1	1.3
Nanobiotechnology	1	1.3
Recombinant DNA Technology	1	1.3
Total	75	100

Table 5. Distribution of research methods used in postgraduate theses

Research methods	F	%
Quantitative	41	63.1
Qualitative	6	9.2
Mixed	18	27.7
Total	65	100

According to Table 5, the quantitative research method was used in 41 (63.11%) postgraduate theses. In the theses examined within the scope of the study, the quantitative research method, one of the most used research methods, was followed by the mixed method (f = 18, 27.7%) and the qualitative research method (f = 6, 9.2%).

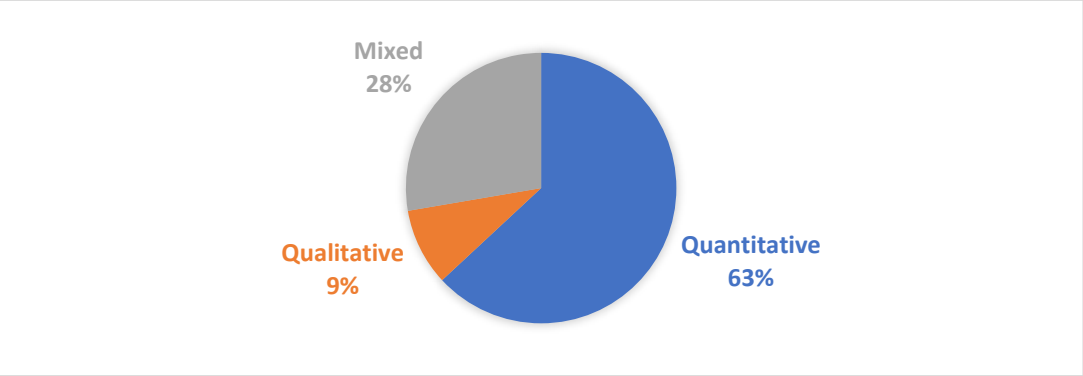

Figure 1. *Percentage values of methods used in postgraduate theses*

When Figure 1 was examined, it was seen that quantitative, mixed and qualitative methods were used the most, respectively, in the examined graduate theses.

Table 6. Distribution of research designs and methods used in postgraduate theses

	Research design	Research method	f	%
Quantitative	Experimental	Quasi experimental	6	9.2
		Pre-experimental	22	33.8
		Sub-total	28	43.0
	Non-experimental	Survey	10	15.3
		Comperative	2	3.1
		Correlational	1	1.6
		Sub-total	13	20.0
Qualitative	Interactive	Case study	2	3.1
		Phenomenographic study	2	3.1
		Sub-total	4	6.2
	Non-interactive	Content analysis	2	3.1
		Sub-total	2	3.1
Mixed	Basic designs	Explanatory (Quan to Qual)	10	15.3
		Explaratory (Qual to Quan)	2	3.1
		Triangulation (Quan+Quan)	4	6.2
		Sub-total	16	24.6
	Advanced designs	Multistage evaluation	2	3.1
		Sub-total	2	3.1
		Total	65	100

The distribution of quantitative, qualitative, and mixed-method studies and designs was analyzed using the table developed by Gul and Sozbilir (2016). According to Table 6, the quantitative research method was the dominant research method (~ 63%) in the theses on the concept of biotechnology, and the number of studies conducted using the qualitative research method (~ 9%) was less than the quantitative and mixed methods (~ 28%). When Table 6 was examined in detail, it was seen that experimental designs (~ 43%) were preferred more than non-experimental designs (20%) in quantitative research. Furthermore, the weak experimental method (~ 34%) was used the most among the experimental design types in the theses, and the quasi-experimental methods (~ 9%) were used less. Among the non-experimental research designs, the most preferred method was the basic descriptive method (~ 15%), followed by causal comparison methods (~ 9%) and relational methods (~ 2%), respectively. When the interactive designs based on qualitative research methodology were examined in detail in Table 6, it was seen that phenomenology (~ 6%) and case studies (~ 3%) were used, whereas action research, ethnographic study, grounded theory, critical studies, and hermeneutic methods were not used.

Within the scope of qualitative methodology, it was seen that the content analysis method among non-interacting designs was used in only two studies (~ 3%). Among the theses examined, the number of mixed-method studies (~ 28%) was higher than those conducted with qualitative study methods (~ 9%). It was seen that basic designs were used more (~ 25%), while advanced designs (~ 3%) were not preferred more than the mixed method. It was revealed that explanatory (~ 15%), triangulation (~ 6%), and exploratory (~ 3%) basic designs were used in mixed-method studies, respectively.

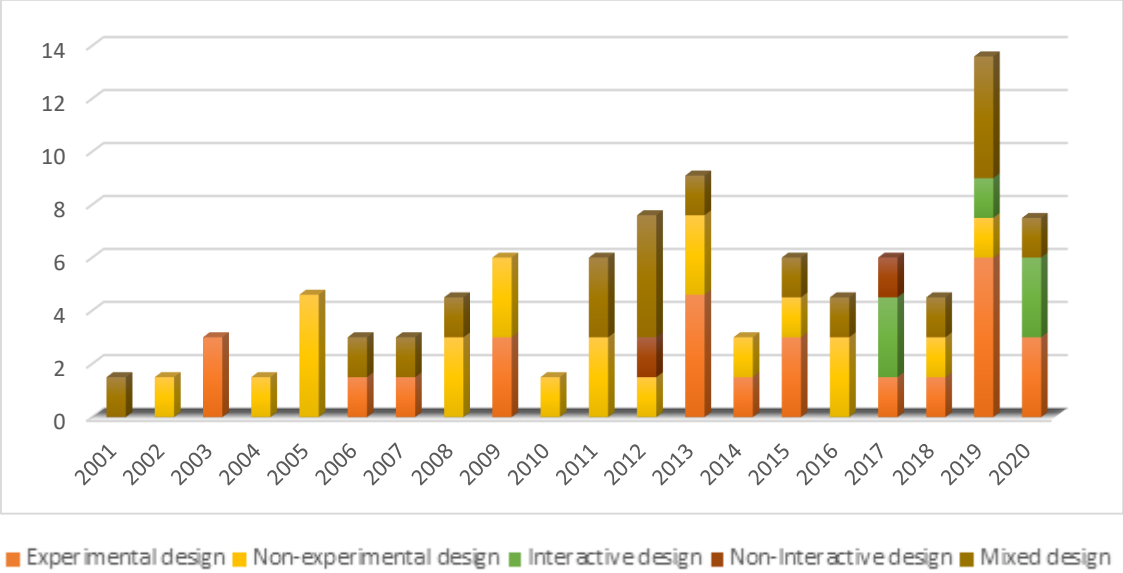

Figure 2. *Percentage values of designs used in postgraduate theses by years*

Figure 2 shows the trends of the theses on the concept of biotechnology in terms of research designs by years. As seen in the figure, interactive research designs were used in 2017, 2019, and 2020. While there were studies using a single type of research design until 2005, 2019 was the year with the highest number of studies and the most diversity in terms of research design. There was a decrease in the number of studies conducted in 2010, and a rising trend has been observed in the number of theses written in the field of biotechnology and the variety of research designs as of 2011. Especially in 2019 and 2020, there was an increase in experimental research designs, while a decrease in non-experimental research designs was observed.

Table 7. Distribution of data collection tools used in postgraduate theses

Type of data collection tools	F	%
Questionnaires*		
Open-ended	3	4.6
Likert type	10	15.3
Multiple choice	-	-
Others	4	6.2
Achievement tests*		
Multiple choice	26	40
Open-ended	8	12.3
Others	10	15.3
Aptitude, attitude, perception, personality etc. tests	47	72.3
Interviews*		
Semi-structured	12	18.4
Structured	1	1.5
Unstructured	-	-
Focus group interviews	-	-
Observations		
Non-participant observation		-
Participant observation	1	1.5
Alternative assessment tools	10	15.3
Documents	1	1.5
Others	1	1.5

The distribution of data collection tools was analyzed using the table developed by Gul and Sozbilir (2016). Among the data collection tools, mostly skills, attitudes, perceptions, personality, etc. tests (~ 72%), achievement tests (~ 67%), questionnaires (~ 26%), interviews (~ 20%), and alternative assessment tools (~ 15%) were used (Table 7). The least preferred data collection tools were documents (~ 2%) and others (~ 2%). Among the types of questionnaires in the studies, Likert type (~ 15%), others (~ 6%), and open-ended questionnaire (~ 5%) types were used, respectively. It was seen that multiple-choice (~ 40%), other (~ 15%), and open-ended (~ 12%) tests were used, respectively, among the achievement tests. The most preferred interviews in the studies were semi-structured interviews (~ 18%) and structured interviews (~ 2%), respectively.

Table 8. Distribution of samples studied in postgraduate theses

Sample	F	%
Middle School students (5-8)		
5th-grade	47	3
6th-grade	-	-
7th-grade	202	13
8th-grade	1154	74
Total	1553	100
High School students (9-12)		
9th-grade	538	25.67
10th-grade	510	24.33
11th-grade	682	32.53
12th-grade	366	17.47
Total	2096	100
University students		
Science teacher candidates	3777	73.20
Biology department teacher candidates	432	8.40
Class teacher candidates	296	5.70
Other departments	655	12.70
Total	5160	100
Teachers		
Science teachers	571	44.16
Biology teachers	179	13.84
Other branches	543	42.00
Total	1293	100

The sample groups used in theses were mostly undergraduate students (f = 5160), high school students (f = 2096), middle school students (f = 1553), and teachers (f = 1293), respectively. When the distribution of the sample populations was examined in detail, it was observed that the most studied sample groups included pre-service science teachers (f = 3777) from university students, 11th-grade students (f = 682) from high school students, and 8th-grade students from middle school students and science teachers (f= 571) from teachers (Table 8).

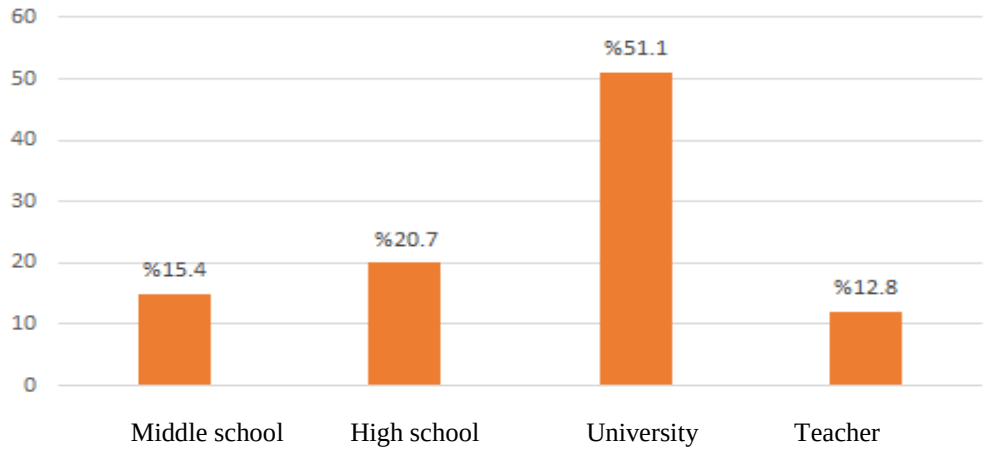

Figure 3. *Distribution of sample groups used in theses*

According to Figure 3, the samples studied in the theses in the field of biotechnology were mostly university students (~ 51%), high school students (~ 21%), middle school students (~ 15%), and teachers (~ 13%), respectively.

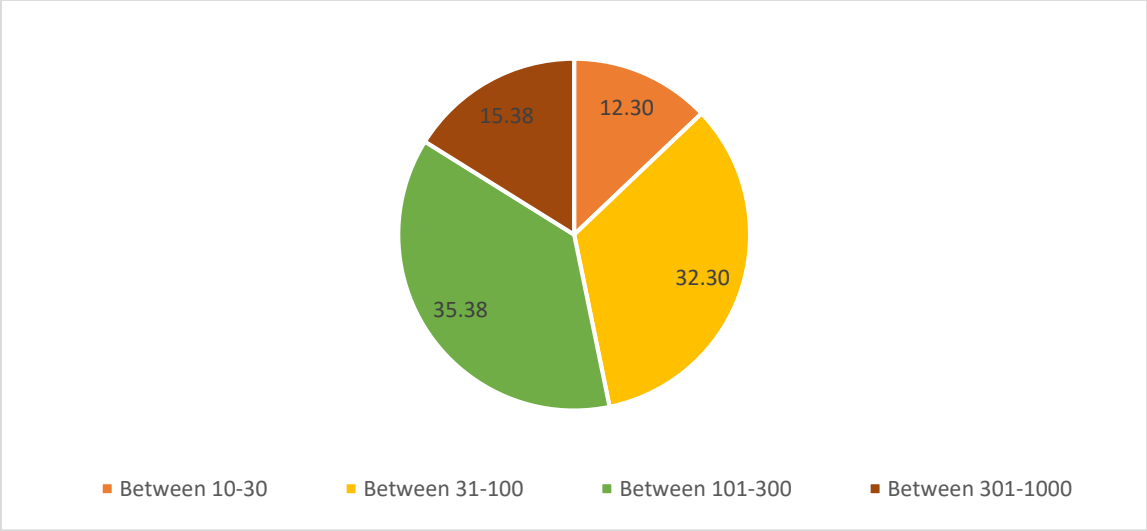

Figure 4. *Distribution of the sample size used in theses*

According to Figure 4, the main sampling range used in theses was 101-300 (35.38%). This sample range was followed by the sampling intervals of 31-100 (32.30%), 301-1000 (15.38%), and 10-30 (12.30%), respectively.

4 | Discussion & Conclusion

This study conducted the content analysis of postgraduate thesis studies done nationally between 2000-2020 on the use of biotechnology and other concepts related to this concept in the field of science education. Upon examining the findings obtained from the research in line with the research questions, it is noteworthy that the first thesis study conducted in Turkey in the field of biotechnology education was prepared in 2001 as a master's thesis, and the first doctoral dissertation was conducted in 2005. Considering that the effects of biotechnological developments on human life started in the last quarter of the 20th century and continued increasingly in the 21st century, it is a very positive finding that the first thesis study in Turkey was conducted in the early 2000s and continued to increase depending on the years. This finding shows that in parallel with biotechnological developments, biotechnology education studies have also started in the field of science education, and the subject has attracted increasing attention. However, another factor that caused this increase is that although the history of scientific research in the field of science education in Turkey dates back to the 1990s (Sozbilir & Canpolat, 2006), there are very few scientific studies in the literature before these years. Moreover, it can be said that research in science education gained speed in our country with the restructuring of education faculties in 1997 (Kaltakcı-Gurel et al., 2017). Likewise, according to the results of the research conducted by Dogru et al. (2012) to analyze the content of master's and doctoral theses on science education in Turkey between 1990 and 2009, a significant increase has been observed in the number of theses in all fields since 2005-2006.

Another remarkable finding is that approximately 85% of the postgraduate theses included in the content analysis were master's theses, and very few doctoral dissertations were written. According to the study results, most of the thesis studies on the aforementioned concepts were master's theses because the number of graduate students in our country was higher than the number of doctoral students. However, it was thought that it would be positive for researchers to focus on biotechnology-related topics in their doctoral studies, even in a small number, in terms of responding to the need and contributing to the field when the speed of developments in this field was taken into account.

Considering the distribution of theses in the CoHE National Thesis Center by universities, it was determined that postgraduate theses on biotechnological concepts and written in the field of science education were carried

out in a total of 27 universities in Turkey, and most of these theses (about one-third) were prepared at Gazi University. After Gazi University, Inonu University and Bolu Abant Izzet Baysal University stand out.

When the subject distribution of the postgraduate theses on biotechnological concepts in our country was examined, it was observed that learning (~ 30%)-based thesis studies were dominant, attitude/perception/interest (~ 25%) studies were in the second place, followed by teaching (~ 19%) studies. In line with these results, it can be said that the topics of learning and teaching stand out among the subjects studied in relation to biotechnological concepts. Considering the field of biotechnology, there are many studies in the literature in which there are difficulties in learning the concept, misconceptions, and students have inadequate and incorrect information (Dawson, 2007; Prokop, Lešková, Kubiatko and Diran, 2007; Surmeli & Sahin, 2009; Semenderoğlu & Aydın, 2014; Usak, Erdogan, Prokop & Özel, 2009; Yuce & Yalcın, 2012). The fact that postgraduate thesis studies carried out in the field of learning include subjects such as determining the level of knowledge/achievement, conceptual understanding, and meaningful learning was very positive at the point of determining and solving the problems encountered in learning biotechnological concepts. It is remarkable that teaching studies are mostly based on method and technique comparisons. In this sense, postgraduate thesis studies conducted to determine different teaching methods and techniques that were thought to be effective in learning contributed significantly to the literature.

Another interesting result is that nearly a quarter of the graduate thesis studies were subject-oriented attitude/interest/perception studies. There are many studies in the international literature, stating that biotechnological applications bring cultural, social, political, and economic discussions together and individuals who make up society usually have a negative attitude due to insufficient information (Dawson, 2007; Eaton, 2004; Gray & Bryce, 2006; Haynie & Greenberg, 2001; Leslie & Schibeci, 2006; Saez, Nino & Carretero, 2008). In this sense, it is an expected result that attitude/interest/perception subjects are among the most studied subjects in postgraduate thesis studies conducted in Turkey. It is also a striking finding that there are thesis studies on the issues of determining opinion, determining skills and beliefs, apart from the first three study topics mentioned above. However, the bioethics discipline, which has been emphasized to be very important in the literature, and the context of values education are among the topics of only seven dissertations (Altıparmak, 2005; Gor, 2019; Sürmeli, 2008; Yaman, 2011; Yazıcı, 2009; Yuce, 2011; Turgut, 2018). Considering that individuals exhibit an ethical attitude in the actions they face according to the belief and value system shaped by the cultural values of the society they live in (Ilgaz & Bilgili, 2006; Keskin, Samancı & Kurt, 2013), revealing the situation in our country will contribute significantly to the science education literature.

Considering the examined theses in terms of method, it was seen that mostly quantitative studies (f = 41) were performed and most of the remaining studies were conducted with the mixed method (f = 18). It was concluded that studies using qualitative research methodology (f = 6) were limited. The research questions in theses were mostly related to the knowledge, attitude, perception, risk-taking, etc. of the participants, and this may be the reason for the predominant use of the quantitative method. Theses using the mixed method also attract attention. The mixed method, in which qualitative and quantitative methods are blended together, is more effective than using these methods separately in terms of a better understanding of research problems (Creswell, 2008). It was seen that studies in which the qualitative research method was used alone were very limited. At every step of the qualitative research process, researchers are given the opportunity to develop new methods and approaches and make new arrangements to increase the impact of the research (Guba & Lincoln, 1994; Merriam, 1998). The difficulty in interpreting qualitative results for new researchers (Sozbilir, Kutu & Yasar, 2012) may be the reason for the limited use of qualitative methods in studies. In the theses, studies were carried out mostly with quantitative, mixed, and qualitative methods, respectively. Similar to the results of the current study, there were studies conducted mainly with mixed and quantitative methods in the literature (Inam & Guven, 2019; Kiras, 2019; Memis, 2017).

Among the quantitative research methods used in theses, experimental designs were preferred more than non-experimental designs. It was seen that weak experimental designs (f = 22) among the experimental designs were used more than quasi-experimental designs (f = 6).

Among the non-experimental quantitative methods, the most frequently used research model was the descriptive (screening) (f = 10) model. The reason for the frequent use of survey models can be shown as research

problems in dissertations that focus on identifying the knowledge, attitude, and perception of the participants regarding biotechnology.

In theses, talent, attitude, perception, personality, etc. tests (f = 47), achievement tests, Likert-type questionnaires, and semi-structured interviews were mostly used as the data collection tools (Table 7). The widespread use of quantitative research methods in the theses examined can be shown as the reason for the predominant use of tests such as skills, attitudes, perception, personality, etc. as data collection tools. In particular, multiple-choice achievement tests are preferred over alternative assessment tools due to the easier preparation, implementation, and scoring of multiple-choice tests. The results we obtained regarding the data collection tools in the theses are similar to the results of the study by Gul and Sozbilir (2015). Likert-type questionnaires are among the most widely used data collection tools (Sozbilir et al., 2012), and as data collection tools, surveys generally enable the quick and easy collection of data (De Joung, 2007). Questionnaires are frequently used in theses because they provide fast and easy data collection.

It was seen that participant observation was used as a data collection tool in only one study. Among the theses examined, qualitative studies were fewer in number than studies conducted with quantitative and mixed methods. The lower preference of qualitative research methods in theses can be shown as the reason why observation was used very little as a data collection tool (Ciltas, Guler & Sozbilir, 2012). Considering the sample populations, the most preferred sample group was university students, followed by high school students, middle school students, and teachers, respectively. The most preferred sample group was at the undergraduate level, and working especially with pre-service teachers emphasizes the importance of teacher education and raising individuals who are familiar with subjects, concepts, and processes related to biotechnology as future teachers. Moreover, research is conducted with students at the undergraduate and high school levels because these samples are the most suitable populations for research problems and are easily accessible. In the theses examined, the sample size used was between 101-300, 31-100, 301-1000, and 11-30, respectively, from high to low. In qualitative studies, sample sizes of less than 50 people are preferred, while quantitative studies are carried out with samples of 500 or more (Yagan & Cubukcu, 2021). It can be said that the sample size was generally large since the quantitative research method was mainly used in the theses examined in the present study (f = 41). A study examining international trends in biology education research through content analysis revealed that qualitative research methods were used predominantly and sample sizes were mostly between 31 and 100 (Gul & Sozbilir, 2015), which is consistent with the results of our study.

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Appendix 1. The postgraduate theses examined in the study (f=65)

Thesis No	Thesis Author/ University	Thesis Name	Thesis Year
1	Yunus Ozyurt/Bolu Abant Izzet Baysal University	Diagnosis of key science concepts and examination of science teaching programs and national textbooks within the context of these concepts	2020
2	Fatma Nur Turan/Hacettepe University	Student conceptions about cloning	2020
3	Ebru Yilmazcelik/Suleyman Demirel University	The effect of argumentation method on the academic achievement and attitude of science teacher candidates in 'Genetic copying' unit	2020
4	Merve Tabak/Eskisehir Teknik University	High school students 'attitudes, opinions and purchase intention on genetically modified organisms: An examination in Eskisehir TOKİ Şehit İkram Cirit Anatolian High School	2020
5	Derya Kara/Gazi University	Opinions of primary school teacher candidates' about genetically modified organisms one of the socio-scientific topic	2020
6	Veysel Arslankara/ Necmettin Erbakan University	Opinions of prospective science teachers on the importance of biotechnology in science education: The case of Konya	2019
7	Tugce Yagmur Orhan/ Mugla Sıtkı Kocman University	The impact of innovative teaching approaches on the biotechnology related laboratory experiences of science teachers	2019
8	Ramazan Sogukpinar/Aydin Adnan Menderes University	Investigation of preservice science teachers' attitudes towards genetic and biotechnology	2019
9	Fatma Eda Vuran/Gazi University	The effect of genetic engineering and biotechnology activities on students 'success, attitude and self evaluations	2019
10	Hilal Agac/Canakkale Onsekiz Mart University	The effect of science teacher candidates on knowledge and attitudes of structured experimental applications on 'agricultural biotechnology'	2019
11	Selin Akdoner/Cukurova University	Investigation of the effect of the application of the development of argumentation - supported cooperative learning methods on the genetics of a modified organization (GMO) on the academic achievements of the ten years students	2019
12	Kaan Inaltekin/Gazi University	Knowledge levels and attitudes of secondary school 7th and 8th year students about genetically modified organisms	2019
13	Selvi Gor/Aksaray University	Determination of character and value trends of science teacher candidates related to genetically modified organisms (GMO)	2019
14	Ayten Yildirgan/ Aksaray University	Science 3. graduate teacher candidates determination of the opinions of genetically modified organisms	2019
15	Emine Guney/Necmettin Erbakan University	Development of attitude scale about genetically modified organisms and evaluation of biology student teachers' attitude about genetically modified organisms in terms of different variable	2018
16	Muzeyyen Akyuz/Karadeniz Teknik University	The effect of argumentation-based learning environment on pre-service elementary teachers' conceptual understanding a case of genetically modified organism	2018
17	Duygu Turgut/Pamukkale University	Investigation of class-based to science teacher candidates' bioethical values, scientific literacy levels and empathy skills	2018
18	Meryem Demirci/Kafkas University	Experimental planning on teaching of biotechnology and genetic engineering for 8th grade students	2017

19	Fatma Bilgican/Balıkesir University	Designing instructional material for teaching the biotechnology topic with usage of active learning at secondary schools	2017
20	Zeynep Ertas Karaaslan/Dicle University	Preservice science teachers' metaphors and visual images on genetically modified organisms (GMO)	2017
21	Eyuphan Bahadir/Giresun University	The determination of prospective classroom teachers views on genetically modified organisms	2017
22	Asiye Kilinccioglu/Gazi University	Investigating the level of ability of 8th level science and technology syllabus to raise interest of students towards biotechnology	2016
23	Emine Camur/Gazi University	The relationship of pre-service biology teachers' attitudes towards biotechnology practices and their scientific epistemological beliefs	2016
24	Gulay Urhan/Gazi University	An examination of students' quality of arguments and informal reasoning skills in argumentation based learning environments	2016
25	Esra Acikgul Firat/ Inonu University	Effects of instruction supported by web 2.0 tools on prospective teachers' biotechnology literacy	2015
26	Sevde Yasar Cimen/Fatih University	Uygulamalı biyoteknoloji eğitiminin öğretmen ve öğretmen adaylarının biyoteknolojik algıları üzerine etkileri	2015
27	Asli Kocyigit/Ondokuz Mayıs University	Determination of level of knowledge, self-efficacy confidence, attitudes and risk perceptions of science teachers about GMOs and their products	2015
28	Halil Kaya/Cukurova University	Biotechnology education from the teachers' perspective	2015
29	Elif Sonmez/Kastamonu University	The effects of extra-curricular activities of biotechnology on students' biotechnology knowledge and their nature of science perceptions	2014
30	Umit Demiral/Karadeniz Teknik University	Investigating argumentation skills of pre-service science teachers in a socio-scientific issue in terms of critical thinking and knowledge level: GM foods case	2014
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Teacher Autonomy as a Predictor of Job Satisfaction

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ABSTRACT

This study aims to examine the association between teacher autonomy and job satisfaction. To this end, the study employed a relational survey model. The sample of the study included 368 teachers working in different schools of Batman city (Turkey) in the spring term of the 2020-2021 academic year. Teachers representing the population of the research were selected through a random sampling method. Research data were amassed with the "Teacher Autonomy Scale" and "Teacher Job Satisfaction Scale". The mean scores were calculated and Pearson correlation and simple regression analyses were conducted. Based on the findings of the research, teachers' opinions towards autonomy behaviours and job satisfaction are high level. The results also show a positive and significant relationship between teachers' autonomy and job satisfaction; teachers' autonomy behaviours are meaningful predictors of their job satisfaction. Moreover, teachers' autonomous behaviours reveal 7.2% of their job satisfaction.

Keywords: Teacher, teacher autonomy, job satisfaction.

İş Doyumunun Bir Yordayıcısı Olarak Öğretmen Özerkliği

ÖZ

Bu araştırma öğretmenlerin özerklik davranışları ile iş doyumları arasındaki ilişkiyi incelemeyi amaçlamaktadır. İlişkisel tarama deseninde tasarlanan araştırmaya, 2020-2021 eğitim ve öğretim yılı ikinci döneminde Batman (Türkiye) merkezde görev yapan 368 öğretmen katılmıştır. Araştırmanın evrenini temsil edecek öğretmenler tesadüfi örnekleme yöntemiyle belirlenmiştir. Verilerin toplanmasında "Öğretmen Özerkliği Ölçeği" ve "Öğretmen İş Doyumu Ölçeği" kullanılmıştır. Veri analizinde aritmetik ortalama, Pearson korelasyon katsayısı ve basit regresyon analizlerinden yararlanılmıştır. Araştırma sonuçlarına göre öğretmenlerin özerklik davranışlarına ve iş doyumlarına ilişkin yüksek düzeyde olumlu görüş belirttikleri; öğretmenlerin özerklik davranışıyla iş doyumları arasında pozitif yönlü, anlamlı bir ilişki olduğu ve öğretmenlerin özerklik davranışlarının onların iş doyumlarının pozitif yönde, anlamlı yordayıcısı olduğu tespit edilmiştir. Bununla birlikte öğretmenlerin özerklik davranışlarının öğretmenlerin iş doyumlarının %7.2'sini açıkladığı saptanmıştır.

Anahtar kelimeler: Öğretmen, öğretmen özerkliği, iş doyumu.

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1 | INTRODUCTION

The teaching profession is regarded not only as a bridge between teachers offering information and students receiving this information, but it is also one of the earliest career professions in which, by its nature, intensive social relationships are experienced as well as being inevitable for social life (Aydın, 2018; Bursalıoğlu, 2010). One of the concrete signs that any profession is regarded as a professional profession is the autonomy that the profession already possesses (Buyruk & Akbaş, 2021). In this regard, it has been claimed that autonomy is a critical term associated with the professional development of the teaching profession (Parker, 2015). Teacher autonomy playing a pivotal role in certain studies aiming to improve educational activities (Freidman, 1999; Limon & Aydın, 2020) may be said to contribute to teachers, students, teaching-learning processes, and educational institutions (Ayral et al., 2014; Çolak & Altınkurt, 2017). In the related literature, lots of research efforts in various perspectives have been directed towards the concept of teacher autonomy about which there are certain positive viewpoints (Öztürk, 2011). Deci and Ryan (2000) state that teacher autonomy can be associated with teachers' right to choose their own goals, teaching methods, and educational strategies although Çolak and Altınkurt (2017) define the concept as teachers' decision-making power, competency, and independence towards such issues as students, educational activities and educational institutions. Similarly, Ertürk (2020) argues that teachers' autonomy and freedom for their professional actions are considered as the fundamental elements of autonomy. Teacher autonomy having a great impact upon teachers' professional development (Akçay & Sevinç, 2021) allows teachers to have a voice in decisions related to the schools or, in particular, teachers themselves (Çolak et al., 2017). Autonomy enables teachers to reflect their potentials and increases their organizational commitment. In this regard, it is suggested that teacher autonomy contributes to teachers' being more powerful and effective in educational activities (Ertürk, 2020). The current studies in the education field have been seen to centre upon (Moomaw, 2005). Teacher autonomy is affected by perceived organizational support, teacher specialty, collaboration among colleagues (Kılınç et al., 2018). Teacher autonomy is associated with teachers' morale (Yıldız et al., 2021) and stress (Pearson & Moomaw, 2005), job engagement and satisfaction (Skaalvik & Skaalvik, 2014), and the intent to remain in teaching (Worth & Van den Brande, 2020). As a result of the above-mentioned associations, teacher autonomy is crucial in terms of the effectiveness of schools (Koustelios et al., 2004).

Job satisfaction plays a pivotal role in students' achievements thanks to its effectiveness of teachers and, not surprisingly, educational institutions (Demirtaş, 2010; Lopes & Oliveira, 2020). There have been certain discrepancies about job satisfaction in the literature (Aziri, 2011). In education research to date, the concept of job satisfaction has been extensively investigated in many ways. One of the most comprehensive definitions has been given by Locke (1976) as *"a pleasurable and positive emotional state resulting from the appraisal of one's job or job experiences."* Evans (1997) defines job satisfaction as *"a state of mind encompassing all those feelings determined by the extent to which the individual perceives his/her job-related needs to be met*." Skaalvik and Skaalvik (2021) conceptualize job satisfaction as a motivational structure emphasizing teachers' affective responses to their work. However, according to Zembylas and Papanastasiou (2004), job satisfaction indicates a teacher's affective relationship with his/her teaching role. Job satisfaction is a significant indicator of employees' contentedness (Çolak et al., 2017) and an important prerequisite for organizations to develop an understanding for them and to enable the employees to realize their contributions towards the organization (Zencirkıran & Keser, 2018). It has been suggested that job satisfaction that draws researchers' attention to a great extent due to its effect on the quality of education requires an in-depth examination (Kengatharan, 2020b). Whether teachers gain satisfaction from their organizations depends on numerous variables (Büyükgöze & Özdemir, 2017; Çetinkanat, 2000; Gülbahar, 2020). The levels of teachers' job satisfaction have an impact upon their attitudes towards the job and the performance of the organization. Teachers with a higher level of job satisfaction may be more eager, effective, and efficient while performing educational activities (Çolak et al., 2017) whereas it is unlikely to utter the same for teachers with a low level of job satisfaction (Handsome, 2009).

By the 1930s, investigating employees' attitudes towards their job satisfaction has contributed to the related literature on the variables causing employees to be satisfied or dissatisfied with their organizations (Evans, 1977). It may be stated that there are numerous variables influencing job satisfaction playing a pivotal role in terms of the employees and the organizations to which employees are committed (Limon et al., 2021; Şahin, 2013; Taş, 2017). Of these variables, teacher autonomy has various positive effects on education systems by enabling teachers to be autonomous in a variety of activities related to their professions (TEDMEM, 2015). The fact that teachers'

autonomy increases while fulfilling their educational activities are expected to enhance their job satisfaction as well (Özaslan, 2015; Zencirkıran & Keser, 2018). As a result, it may be asserted that teachers' job satisfaction and, not surprisingly, their productivity are fostered owing to teacher autonomy (Lawson, 2004; Peter, 2013). It is considered inevitable that teachers who have freedom for choosing their methods and strategies have positive attitudes towards their jobs and higher levels of job satisfaction (Deci & Ryan, 2000). Eventually, teachers demonstrating higher levels of autonomous behaviours are said to possess positive emotions and attitudes towards the teaching profession (Canbolat, 2020; Shann, 1998). According to Şentürken & Aytunga (2020), teachers with high levels of autonomy and job satisfaction lead to higher performance in their professional development. Based on the theoretical framework and previous studies, it has been claimed that the aforementioned variables are required to be elaborated upon. This study simply aims to reveal how teachers' autonomy behaviours are associated with job satisfaction. To this end, this study sought answers to the following questions:

RESEARCH QUESTION

1. *What are the levels of teachers' opinions on autonomy behaviours and job satisfaction?*
2. *Are there any relationship between teachers' autonomy behaviours and job satisfaction?*
3. *Do teachers' autonomy behaviours significantly predict their job satisfaction?*

2 | METHOD

Design of the study, population and sample, data collection instruments, implementation process, and data analysis are included under this heading.

DESIGN

This study investigated the association between teachers' autonomy and job satisfaction and employed a relational survey design the purpose of which is to identify the occurrence and extent of change among a range of variables (Fraenkel & Wallen, 2009).

POPULATION AND SAMPLE OF THE STUDY

The population of the study consisted of 5.362 teachers from different schools in the province of Batman (*Turkey*) in the spring term of the 2020-2021 academic year. Teachers representing the population of the study were selected through random sampling technique (Balcı, 2013). Of all the teachers in the sample of the study, 368 teachers responded to this research. Based on the criteria in the literature, it is possible to say that the sample of the study (n=368) is able to be representative of the entire population in question (n=5.362) (Cohen et al., 2000).

Table 1. Demographic characteristics of the participants

Variable	Group	Frequency	%
Gender	Female	197	53.53
	Male	171	46.47
Level of Schools	Pre-primary	46	12.50
	Primary	109	29.62
	Secondary	122	33.15
	High School	91	24.73
Professional Seniority	0-5 years	102	27.71
	6-10 years	71	19.30
	11-15 years	62	16.85
	16-20 years	64	17.39
	21 years and above	69	18.75
Level of Education	Master's Degree	48	13.00
	Bachelor's Degree	320	87.00
Marital Status	Single	91	24.70
	Married	277	75.30
	Total	368	100

According to Table 1, out of the total sample size, 197 (53.53%) of the respondents were female and 171 (46.47%) were male. Of all participants in the sample, 46 (12.50%) teachers serve in pre-primary schools, 109 (29.62%) in primary schools, 122 (33.15%) in secondary schools, and 91 (24.73%) in high schools. As for their professional seniority, 102 (27.71%) of teachers had 0-5, 71 (19.30%) 6-10, 62 (16.85%) 11-15, 64 (17.39%) and

60 (18.75%) 21 or more years of experience. As for their levels of education, 48 (13.00%) of teachers had master's and 320 (87.00%) bachelor's degrees. 91 (21.30%) of teachers were single and 277 (75.30%) were married.

DATA COLLECTION INSTRUMENTS

Teacher Autonomy Scale

Teacher autonomy was measured through the *"Teacher Autonomy Scale"* (Skaalvik & Skaalvik, 2009) that was based on self-report. The Turkish version of the scale was adapted by Sökmen (2018). The scale is unidimensional and has three items. It was designed in a 6-point Likert scale form. In this scale, the degree of agreement varies from (1) *Strongly Disagree* to (6) *Strongly Agree*. A sample item is *"I am free to choose among teaching method and techniques during everyday teaching"*. The scale's Cronbach's Alpha was calculated to be α=.84 (Skaalvik & Skaalvik, 2009). As for its Cronbach's Alpha found in its Turkish version, it was found as α=.77 (Sökmen, 2018). However, Cronbach's Alpha found in the current study was found as α=.70. According to this result (α=.70), the scale's reliability was supported (Karagöz & Bardakçı, 2020).

Teacher Job Satisfaction Scale

Teachers' job satisfaction was measured through the scale developed by Skaalvik and Skaalvik (2010). This scale was adapted to Turkish by Yerdelen (2013). The scale consists of only one dimension and three items. It is a 5-point Likert scale. In the first item, (1) refers to *"never"* and (5) refers to *"a great deal".* In the second item, (1) refers to *"never true"* and (5) *"always true".* Lastly, in the third item, (1) refers to *"never"* and (5) *"always".* A sample item is *"Have you ever thought of quitting the teaching profession?"* The Cronbach's Alpha coefficient was computed as α=.71 by Skaalvik & Skaalvik (2010). On the other hand, it was computed as α=.87 by Yerdelen (2013). It was α=.80 in this study. According to this result (α=.80), the scale's reliability was supported (Karagöz & Bardakçı, 2020).

DATA COLLECTION AND DATA ANALYSIS

Teacher Autonomy Scale and *Job Satisfaction Scale* were delivered to the teachers in the sample through online communication tools. The research data were processed using Statistical Package for Social Sciences (SPSS) version 25 and several sets of statistical analyses were performed. Firstly, whether there was missing or wrong data in the dataset was investigated (Tabachnick & Fidell, 2001). However, no missing or wrong one was found. Secondly, the Kolmogorov-Smirnov test was carried out in order to determine whether the sample is generated from a normally distributed population. In this regard, kurtosis and skewness values were analyzed. It was decided that the dataset was suitable for parametric statistical analysis (Büyüköztürk, 2017). Frequency (*f*) and percentages (%) towards the personal information of the respondents were computed. The mean ($\overline{X}$) and standard deviation (SD) of the respondents' responses to all the statements in both questionnaires were investigated in order to disclose teachers' opinions on autonomous behaviours and job satisfaction. With an aim to unveil the aforementioned relationship, correlation and simple regression statistical techniques were performed. *In the first place*, Pearson's correlation coefficient analysis measuring the linear association between normally distributed variables was conducted. *Secondly*, a simple regression analysis was carried out to examine whether autonomous behaviours of teachers predicted their job satisfaction (Balcı, 2013).

RESEARCH ETHICS

Ethical approval (approval date: 28.05.2021 and number: 2021-2/17) was taken from Batman University.

3 | FINDINGS

This section covers the findings concerning descriptive analyses, teachers' opinions towards their autonomous behaviours and job satisfaction, the relationship between teachers' autonomous behaviours and job satisfaction, and the predictor role of teachers' autonomous behaviours on their job satisfaction.

Teachers' opinions regarding their autonomous behaviours and job satisfaction

Table 2 depicts the means and standard deviations concerning teachers' opinions on their autonomous behaviours and job satisfaction.

Table 2. Means and standard deviations concerning teachers' opinions on their autonomous behaviours and job satisfaction

	N	$\overline{X}$	SD
Teacher Autonomy	368	5,34	.75
Teacher Job Satisfaction	368	4,05	1,03

As shown in Table 2, teachers' opinions regarding the Teacher Autonomy Scale rated on a 6-point Likert type are above the average ($\overline{X}$=5,34, SD=.75). Within the context of higher levels of opinions of teachers participating in the study towards autonomous behaviours, it may be concluded that the respondents felt themselves autonomous. In addition, teachers' opinions regarding Teacher Job Satisfaction Scale rated on a 5-point Likert type are above the average ($\overline{X}$=4,05, SD=1.03). Hence, teachers reported higher levels of opinions on job satisfaction.

The relationship between autonomous behaviours of teachers and their job satisfaction

Table 3 displays the correlation matrix representing the relationship between autonomous behaviours of teachers and their job satisfaction based on teachers' opinions.

Table 3. The correlation matrix between autonomous behaviours of teachers and their job satisfaction

		Teacher Job Satisfaction
Teacher Autonomy	*r*	.268**
	p	.000

***p*< 0.01

As noted in Table 3, a statistically-significant and low-level positive association between autonomous behaviours of teachers and their job satisfaction (r=.268; p<.000) was found.

The predictor role of teachers' autonomous behaviours on their job satisfaction

Table 4 presents simple regression analysis results regarding whether teachers' autonomous behaviours predicted their job satisfaction.

Table 4. Simple regression analysis results concerning the predictor role of teachers' autonomous behaviours on their job satisfaction

	Teacher Job Satisfaction		
	β	*t*	*p*
Constant		5,675	.000
Teacher Autonomy	.365	5,312	.000
	R^2=.072		
	F=28,215 *p*<.05		

As seen in Table 4, simple regression analysis results have indicated that autonomous behaviours of teachers are meaningful predictors of their job satisfaction. Accordingly, teachers' autonomous behaviours predict their job satisfaction (β=365, p<.05) positively. Furthermore, autonomous behaviours of teachers reveal 7.2% of their job satisfaction level [R^2=.072; F=28,215; p<.05] (Büyüköztürk, 2017).

4 | DISCUSSION

The current study aimed to explore the association between the autonomous behaviours of teachers and job satisfaction. The first sub- statement of the study concerning *teachers' opinions on autonomous be according to teachers and their job satisfaction* was evaluated pursuant to descriptive findings. According to the results obtained in the study, teachers had a higher level of opinions regarding autonomous behaviours. This finding is said to be significant since the perception that teachers had sufficient freedom in their professional activities is expected to significantly contribute to fulfilling roles and responsibilities assigned to them (Ertürk, 2020). Moreover, the autonomy granted to teachers in selecting course materials, determining method and techniques to be used in

educational processes, and preparing the curriculum may be said to enhance the levels of teachers' opinions towards autonomy (TEDMEM, 2015). Kılınç et al., (2018) report that teacher autonomy plays a key role in teaching activity and the quality of teachers as the actors of this activity. Parker (2015) also highlights that ensuring autonomy to teachers may be a suitable starting point to resolve current problems in schools. Akçay and Sevinç (2021) state that fostering the level of teacher autonomy may increase teachers' motivation, efficiency, and organizational engagement. In the literature, there are various studies lending support for the finding of the study that the level of teacher autonomy is high (Al-Siyabi, 2016; Buyruk & Akbaş, 2021; Sökmen, 2018; Yıldız et al., 2021). In addition, there are certain studies proposing that the level of autonomous behaviours of teachers is moderate and above (Çolak & Altınkurt, 2017; Çolak et al., 2017; Ertem et al., 2021; Şentürken & Aytunga, 2020; Yazıcı & Akyol, 2017). Further findings from this study indicate that teachers have positive and higher levels of opinions on their job satisfaction. It is also vital to emphasize these findings with respect to individual (Ertürk, 2021) and organizational contexts (Taş, 2017). Inasmuch as, higher levels of job satisfaction suggest that teachers have positive feelings, opinions, and attitudes towards their occupations (Zencirkıran & Keser, 2018). The concept of job satisfaction is related to motivation (Zembylas & Papanastasiou, 2004) and enhances teachers' organizational engagement (Al-Siyabi, 2016). In short, having a higher level of job satisfaction increases teachers' efficiency and performance. Not surprisingly, teachers with high productivity and performance are more effective and efficient in schools (Taylor et al., 2003). Thus, teachers with a high level of job satisfaction are observed to be more engaged and prosperous in educational activities (Çetinkanat, 2000). School principals are inarguably expected to display necessary effort in order to enhance teachers' job satisfaction (Taş, 2017). However, previous studies in the literature supporlevelss finding of the current study that teachers had higher level of job satisfaction (Al-Siyabi, 2016; Demirtaş, 2010; Kengatharan, 2020b; Sökmen, 2018). In addition find there are certain research results in the literature that find that teachers' job satisfaction is moderate (Ayan et al., 2009; Çolak et al., 2017; Demirtaş & Alanoğlu, 2015; Ertürk, 2021; Şahin, 2013; Şentürken & Aytunga, 2020).

As for the second sub-statement of the study investigating the relationship between the autonomous behaviors of teachers and their job satisfaction, a low-level, positive, and meaningful association was observed. Accordingly, teachers' job satisfaction may likely be enhanced by enabling them to make their own decisions of their own will and to display their points of view in classes where educational activities are carried out (Ertürk, 2020). The inclusion of teachers in certain plans regarding educational activities and their display of creativity by articulating their ideas may increase teachers' job satisfaction (Zencirkıran & Keser, 2018). In addition to job satisfaction, autonomy does not only foster teachers' organizational engagement but also ensures educational activities to be performed effectively and efficiently (Ertürk, 2020). The positive and significant relationship obtained in this study is said to be supported by previous studies in the literature (Al-Siyabi, 2016; Fradkin-Hayslip, 2021; Kengatharan, 2020a; 2020b; Koustelios et al., 2004; Skaalvik & Skaalvik, 2014; Şentürken & Aytunga, 2020; Worth & Van den Brande, 2020). On the contrary, there are certain studies clarifying the little significant relationship between autonomy in curriculum and job satisfaction (Pearson & Moomaw, 2005). Furthermore, according to the results of certain studies, a negative association was found between teacher autonomy and job satisfaction (Esfandiari & Kamali, 2016).

With regards to the third and last sub-statement of the study, it was explored whether the autonomous behaviours of teachers predicted their job satisfaction significantly. The results of simple regression analysis indicate that the autonomous behaviours of teachers are a positive and significant predictor of teachers' job satisfaction. This result is also supported by previous studies in the literature (Çolak et al., 2017; Skaalvik & Skaalvik, 2014; Şentürken & Aytunga, 2020; Taylor et al., 2003). Moreover, in the current study, teachers' autonomous behaviours reveal 7.2% of their job satisfaction. In a study conducted by Çolak et al. (2017), the dimensions of teacher autonomy reveal 21% of teachers' job satisfaction; however, the dimensions of teacher autonomy reveal 19% of teachers' job satisfaction in a study carried out by Şentürken and Aytunga (2020).

5 | RESULT

Based on the findings of the study, the level of teachers' opinions on their autonomous behaviours and job satisfaction are high; there is a positive-oriented and meaningful relationship between the autonomous behaviours of teachers and their job satisfaction and teachers' autonomous behaviours are a significant predictor of their job satisfaction.

6 | LIMITATIONS AND RECOMMENDATIONS

The current has some limitations. *First*, the sample was limited with teachers working in the province of Batman. *Second*, the present study was carried out with the teachers working at state schools. *Third*, the data of the study were collected through questionnaires. The opinions of the participants were limited to the items in the questionnaires. *Fourth*, due to the outbreak of Covid-19, the research data were obtained with the assistance of online data collection methods. In the light of the limitations above, certain recommendations were made to practitioners and researchers. In this regard, efforts may be directed to the regular investigations of teachers' job satisfaction by school principals in order to maintain teachers' job satisfaction. Certain precautions may be taken in the light of those investigations. Involving in decision-making concerning educational activities and supporting teachers in their teaching preferences are of great importance to attain teachers' job autonomy. Moreover, similar studies can be conducted in relation to different variables as a predictor of teachers' job satisfaction. The association between teacher autonomy and job satisfaction may be elaborated by using mediator variables. Further studies may be extended to the teachers working in private schools. A comprehensive study may be performed by including other provinces. Similar studies may be carried out with school principals. Qualitative studies may be conducted in order to provide an insight into the variables affecting teacher autonomy and job satisfaction.

STATEMENTS OF PUBLICATION ETHICS

I declare that the research has no unethical problems. Ethical approval (approval date:28.05.2021 and number:2021-2/17) was taken from Batman University.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest. The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Adaptation of Turkish Version of Two Different Self-Control Scales

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ABSTRACT

The trait of self-control is receiving growing attention as it leads to plenty of positive outcomes. Besides, there are so many scales based on different theoretical approaches in the literature. In this study, we aimed to adapt two important self-control scales, namely the Dispositional Self-Control Scale (DSC; Ein-Gar & Sagiv, 2014), and Desire for Self-Control Scale (DSCS; Uzie & Baumeister, 2017) into Turkish. In this context, we evaluated factorial validity, reliability coefficients (Cronbach α and McDonald's ω), discriminant, and convergent validity of these scales among college students sample. We also tested gender differences between men and women on self-control scores for two scales. Overall findings demonstrated that DSC, and DSCS had satisfactory psychometric properties for utilization such as acceptable fit indices, a high level of reliability coefficients, and good discriminant and convergent validity. We also discussed the implications of findings and future research.

Keywords: Desire for self-control scale, dispositional self-control, scale, psychometrics

İki Farklı Öz-kontrol Ölçeğinin Türkçeye Uyarlanması

ÖZ

Öz-kontrol özelliği, çok sayıda önemli sonuca yol açtığı için giderek daha fazla ilgi görmektedir. Bununla birlikte alan yazında farklı teorik yaklaşımlara dayanan pek çok öz-kontrol ölçeği yer almaktadır. Bu araştırmada Öz-kontrol Eğilimi Ölçeği (ÖEÖ; Ein-Gar & Sagiv, 2014) ve Öz-kontrol Arzusu Ölçeği (ÖKAÖ; Uzie & Baumeister, 2017) olmak üzere iki önemli öz-kontrol ölçeğini Türkçeye uyarlanmayı amaçladık. Bu kapsamda, bu ölçeklerin yapı geçerliliğini, güvenirlik katsayılarını (Cronbach α ve McDonald's ω), ölçüt geçerliğini (ayırıcı ve yakınsak geçerliği) inceledik. Ayrıca bu iki ölçek için kadın ve erkek katılımcılar arasında öz-kontrol puanları açısından farklılaşma olup olmadığını test ettik. Analiz sonuçlarından elde edilen tüm bulgular; ÖEÖ ve ÖKAÖ'nün kabul edilebilir uyum indeksleri, yüksek düzeyde güvenilirlik katsayıları ve yüksek düzeyde ölçüt geçerlik sonuçları ile tatmin edici psikometrik özelliklere sahip olduğunu göstermiştir. Bununla birlikte, bulgulardan elde ettiğimiz çıkarımları ve gelecekteki araştırmalara ilişkin önerileri tartıştık.

Anahtar kelimeler: Öz-kontrol arzusu ölçeği, öz-kontrol eğilimi ölçeği, psikometrik

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1 | INTRODUCTION

Self-control is essential in most aspects of our lives as we often face temptations including procrastination at work, eating an extra piece of pizza, spending money, or sleeping one more hour. In other words, resisting immediate pleasures and resolving the dilemmas when we face requires self-control (Gillebaart & de Ridder, 2015). Given the omnipresence of the phenomena in several aspects of our lives, several studies on self-control have been conducted, and different concepts and theories have emerged to describe the construct of self-control (e.g., Baumeister et al.,1998; Gottfredson & Hirschi, 1990; Metcalfe & Mischel, 1999). Self-control is generally defined as the capacity to resist impulses and regulate behaviors, emotions, and cognitions to achieve higher-order goals (Baumeister et al., 2007; Tangney et al., 2004). In addition, self-control has been used synonymously with willpower (Job et al., 2010), self-regulation (Muraven et al., 1999), self-discipline (Duckworth & Seligman 2006), and delay of gratification (Metcalfe & Mischel, 1999).

The literature emphasizes that self-control trait inhibits undesired behaviors and motivates desired behaviors (Baumeister et al., 1998; de Ridder et al., 2012). High self-control is crucial to success across life areas from academic achievements to healthy eating habits to social relationships (Inzlicht et al., 2014). Empirical investigations indicated that high self-control is associated with higher academic performance (Duckworth & Seligman, 2006), better interpersonal functioning and health-related behaviors (Hagger et al., 2005; Tangney et al., 2004), advanced work performance (Sintemaartensdijk & Righetti, 2019), psychological adjustment, and well-being (Hofmann et al., 2013; Tangney et al., 2004). In sum, the trait of self-control promotes a broad range of positive consequences in our lives. Thus, it is not surprising that self-control is encouraged by religions, societies, families, schools, media, scientists, politicians, and businesses (Baumeister & Exline, 1999; Duckworth et al., 2011; Milyavskaya & Inzlicht, 2017).

In a similar vein, due to the beneficial effects of self-control in human life, it is one of the most studied fields in psychology and other social sciences such as philosophy, economics, sociology, criminology, political sciences, and medical sciences (de Ridder et al., 2012; Hofmann et al., 2013; Şimşir & Dilmaç, 2020). To date, about 4050 articles on self-control, self-discipline, self-regulation, delay of gratification, or willpower are indexed in the Web of Science. However, the number of studies on self-control in the Turkish sample is limited. One of the reasons for this limitation may be that only a few self-control instruments were developed in the Turkish sample or adapted to Turkish (e.g., Nebioglu et al., 2012). Hence, in the present study, we reviewed existing self-control scales in the literature, translated two prominent of these scales to Turkish, and reported validity/reliability results: dispositional self-control, and desire for self-control.

DISPOSITIONAL SELF-CONTROL

There are two forms of self-control reported in the literature: state and dispositional (de Ridder et al., 2012; Tangney et al., 2004). State self-control depends on specific domains or situations and differs according to conditions and time. However, dispositional self-control is a rather stable and internally consistent trait-like characteristic and independent of time and situation (de Ridder et al., 2012; Ein-Gar & Sagiv, 2014). Self-control scales existing in the literature were developed to either evaluate particular situations (Rosenbaum, 1980) or stable characteristics (Tangney et al., 2004). Ein-Gar and Sagiv (2014) preferred to measure the stable tendency of self-control and developed the Dispositional Self-Control Scale (DSC) to evaluate the broad aspects of normal self-control behavior that is context-free.

DSC was designed based on an understanding that self-control is an inclination to override two temptations recognized as avoiding pain and obtaining pleasure. These hedonic temptations were conceptualized as not doing right (NDR) and doing wrong (DW). While DW was defined as performing an impulsive manner to get immediate gratification, NDR was defined as postponing necessary duty due to ignoring the undesirable long-term outcomes of this procrastination. Also, DSC items were built yielding and overcoming DW or NDR. To test the psychometric properties of the DSC, Ein-Gar, and Sagiv (2014) conducted five consecutive studies and developed a reliable and valid scale.

DESIRE FOR SELF-CONTROL

The desire for self-control means wishing to be better able to dominate or change temptations and consciously direct feelings, thoughts, and performance. Even if the desire for self-control is described based on trait self-control, it theoretically differs from trait self-control in many aspects such as cognitive source, continuity, and goal setting (Uziel & Baumeister, 2017). The desire for self-control reflects wanting to control the present and future conditions as well as to be in control over everyday life situations (Burger & Cooper 1979). Unlike the self-control theories, self-discrepancy theory enlightens the desire for self-control. This theory highlighted individuals' perception of gaps between their existing state and wanted state (Higgins, 1987). Based on this perspective, Uziel and Baumeister (2017) developed the desire for a self-control scale (DSCS) to assess individuals' wants to have more self-control than one presently has. The research report suggested that DSCS performs well to measure the desire for self-control.

THE PRESENT STUDY

The main purpose of the present study was to translate and provide preliminary evidence of the psychometric properties of the Turkish form of two self-control scales including DSC, and DSCS. As aforementioned, a trait of self-control contributes to numerous desirable consequences in our lives. Therefore, researchers tried to understand self-control mechanisms and conducted ample research. Researchers also provided various methods and strategies to strengthen self-control (Haouser, 2019; Inzlicht & Teper, 2014). Additionally, a variety of instruments were developed such as the Self-Control Schedule (Rosenbaum, 1980), Low Self-Control Scale (Grasmick et al., 1993), Brief Self-Control Scale (Tangney et al., 2004), Stop and Start Control Scales (de Boer et al., 2011), and Habitual Self-Control Questionnaire (HSCQ; Schroder et al., 2013) to measure level trait self-control effectively. However, we recognized that existing self-control scales are very limited and old in Turkey. Thus, we believe that our research would expand self-control studies in Turkey and ensure the representation of different cultures in the literature.

RESEARCH QUESTIONS

1. Is DSC a valid and reliable scale in a Turkish sample?
2. Is DSCS a valid and reliable scale in a Turkish sample?

2 | METHOD

PARTICIPANTS

Our participants consisted of Turkish-speaking college students living in 48 different provinces of Turkey. Of the participants, 367 (73.7%) were enrolled in the Faculty of Education and 131 (26.3%) in the Faculty of Engineering. The distribution of participants was as follows: 113 (22.7%) were first-year students, 128 (25.7%) were second-year students, 156 (31.3%) were third-year students, and 101 (20.3%) were fourth-year students. Participants were 357 (71.7%) women and 141 (28.3%) men, in a total of 498 people. Participants' age ranged from 17 to 50 (M = 20.75; SD = 2.70).

PROCEDURES

We followed a stepwise process for adapting DSC, and DSCS. In the first step, we reviewed self-control scales in the literature. Then we examined these scales in terms of psychometric features. We chose the two prominent scales from them. In the second step, we got permission from the authors who developed the original form of these scales to adopt the scales into Turkish. Afterward, we obtained the ethical approval of the study from Necmettin Erbakan University Scientific Research Ethics Board (Meeting Date: 13.11.2020, Decision No: 2020/87). In the third step, we translated each scale from English to Turkish based on literature recommendations (e. g., Brislin, 1980; Eremenco et al., 2005).

As two authors who carried out this study, who have command of both Turkish and English, we carried out the translations independently. Then we compared the translations and came to a consensus. We sent it to an English language expert to have the translations checked. We held a meeting with an English language expert to make the necessary corrections and evaluate the semantic differences. After completing the translation process, we sent the

instruments to a Turkish language expert to evaluate their suitability for Turkish. We also took the evaluations of the Turkish language expert into account and made necessary corrections.

Finally, we transferred demographic questions and each scale to an online platform (i.e., Google Forms), and shared the study link with the participants using online platforms (Whatsapp, Facebook, e-mail, etc.). All participants also signed the informed consent form before participating in the study.

MEASURES

Dispositional Self-Control Scale (DSC; Ein-Gar & Sagiv, 2014): The scale consists of 17 items (e.g., People can trust me to stay on schedule even if I am overloaded and under a lot of pressure.) This Likert-type scale consists of statements containing five potential participant responses, each ranging from "Never Agree" to "Totally Agree." DSC predicted distant future orientation, aggression, alcohol misuse, and aberrant driving. The developers of the scale found that the scale had an acceptable test-retest (0.73) and internal consistency (Cronbach's alpha ranging between 0.70 and 0.88) scores.

Desire for Self-Control (DSCS; Uziel & Baumeister, 2017): The scale consists of eight items (e.g., I want to be better able to persist in pursuing goals). This Likert-type scale consists of statements containing five potential participant responses, each ranging from "Never Agree" to "Totally Agree."The researchers reported in their experimental work that a strong desire for self-control over a difficult task disrupted target tracking.

Brief Self-Control Scale (BSCS; Tangney et al., 2004): The scale consists of 13 items (e.g., I am good at resisting temptation) and two sub-dimensions: Self-discipline and Impulsivity. This Likert-type scale consists of statements containing five potential participant responses, each ranging from "Never Agree" to "Totally Agree." Turkish adaptation of this scale was carried out by Nebioglu et al. (2016). Nebioglu et al. reported that the BSCS Turkish version explains 41.65% of the total variance and has an acceptable internal consistency (Cronbach alpha ranging from 0.81 to 0.87).

DATA ANALYSIS

We used confirmatory factor analysis (CFA) to verify the factor structure of the DSC, and DSCS scales. We tested the item factor structure with the model fit values in the CFA. As reported by Kline (2019) χ^2 /df <5, CFI >0.90, SRMR <0.10, RMSEA <0.08 considered acceptable fit. We used sub-dimensions of the BSCS for discriminant and convergent validity of DSC and DSCS scales. We reported Cronbach alpha (α) and McDonald's omega (ω) for the reliability of DSC, and DSCS scales. We analyzed this study using IBM SPSS Statistics 21.0 and Amos Graphics 24.

RESEARCH ETHICS

The study was in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study approved by Necmettin Erbakan University Scientific Research Ethics Board (Meeting Date: 13.11.2020, Decision No: 2020/87).

3 | FINDINGS

DESCRIPTIVE STATISTICS AND RELIABILITY ANALYSIS

As seen in Table 1, the Skewness and Kurtosis scores obtained from the scales range from -2 to +2. This range is consistent with the normal distribution cut-off scores reported in the literature (George & Mallery, 2010). To determine the reliability coefficients of the scales, we calculated both the Cronbach α and McDonald's ω scores. Cronbach's alpha ($\alpha \geq .74$) and McDonald's omega ($\omega \geq .73$) values taken from the sub-dimensions of the DSC scale are acceptable. Moreover, Cronbach's alpha ($\alpha = 0.87$) and McDonald's omega ($\omega = 0.88$) values obtained from the DSCS scale are good.

Table 1. Descriptive Statistics and Reliabilities

Factor	Items	M	SD	α	ω	Skewness	Kurtosis
DSC YNDR	3	16,1526	5,23039	0.82	0.97	-,196	-,724
DSC ONDR	5	16,90	2,48074	0.83	0.84	,011	,281
DSC YDW	4	8,4036	3,81880	0.87	0.87	,988	,598
DSC ODW	4	13,8775	3,05138	0.74	0.73	-,059	-,027
DSCS	8	32.33	6.91	0.87	0.88	-0.91	0.47

Note: DSC YNDR= Dispositional Self-Control Yielding to NDR temptations, DSC ONDR= Dispositional Self-Control Overcoming NDR temptations, DSC YDW=Dispositional Self-Control Yielding to DW temptations, DSC ODW= Dispositional Self-Control Overcoming DW temptations, DSCS= Desire for Self-Control Scale, M = Mean, SD = Standard deviation, α = Cronbach Alpha, ω: Mcdonald's Omega.

DISCRIMINANT AND CONVERGENT VALIDITY

When we examined the relationship between the sub-dimensions of the DSC scale and the sub-dimensions of the BSCS scale, we found moderate negative correlation between DSC Yielding to Not Doing Right temptations (DSC-YNDR) and BSCS/Self-discipline (r = −0.40); moderate positive correlation between DSC-YNDR and BSCS/Impulsivity (r = 0.47); insignificant correlation between DSC Overcoming Not Doing Right temptations (DSC-ONDR) and BSCS/Self-discipline (r = 0.03); negative low-level correlation between DSC ONDR and BSCS/Impulsivity (r = −0.14); negative moderate correlation between DSC Yielding to Doing Wrong (DSC-YDW) and BSCS/Self-discipline (r = −0.39); moderate positive correlation between DSC YDW and BSCS/Impulsivity (r = 0.54); moderate positive correlation between DSC Overcoming Doing Wrong (DSC ODW) and BSCS/Self-discipline (r = 0.51); moderate negative correlation (r = −0.46).

Additionally, there was a negative moderate correlation between DSCS and BSCS/Self-discipline (r = −0.47), while there was a positive correlation between DSCS and BSCS-Impulsivity (r = 0.28), even if a low level. Correlation values can be seen in Table 2.

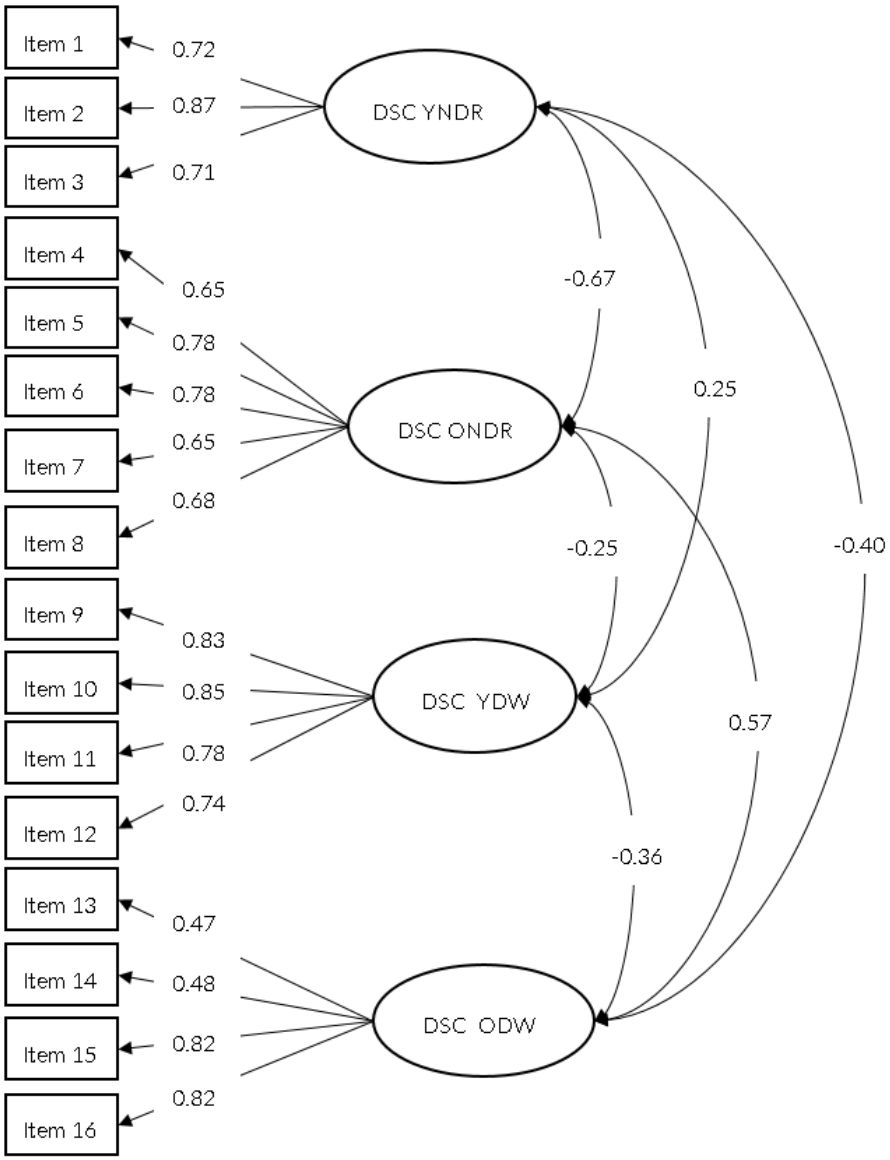
Table 2. Correlations Statistics among the Self-Control Scales

Scale	BSCS Self-disciple	BSCS Impulsivity
Dispositional Self-Control Yielding to NDR temptations (DSC YNDR)	-0.40**	0.47**
Dispositional Self-Control Overcoming NDR temptations (DSC ONDR)	0.03	-0.14**
Dispositional Self-Control Yielding to DW temptations (DSC YDW)	-0.39**	0.54**
Dispositional Self-Control Overcoming DW temptations (DSC ODW)	0.51**	-0.46**
Desire for Self-Control Scale (DSCS)	-0.47**	0.28**

**p < .01.

CONFIRMATORY FACTOR ANALYSIS

We performed a CFA with maximum likelihood extraction to verify the factor structures of the Turkish version of DSC. We found that the factor loads of the one item in the Turkish version of DSC were less than 0.30. We performed the CFA on the remaining sixteen items. The four-factor model revealed an acceptable fit (χ^2/df = 3.71; CFI = 0.92; SRMR = 0.06; RMSEA = 0.07). Factor loadings of the items can be seen in Figure 1.



Note: DSC YNDR= Dispositional Self-Control Yielding to NDR temptations, DSC ONDR= Dispositional Self-Control Overcoming NDR temptations, DSC YDW=Dispositional Self-Control Yielding to DW temptations, DSC ODW= Dispositional Self-Control Overcoming DW temptations

Figure 1. *Four Factor CFA Model of the DSC*

We performed a CFA with maximum likelihood extraction to verify the factor structures of the Turkish version of DSCS. We found that factor loads of all items in the Turkish version of the DSCS were more than 0.30. Eight-item single factor model revealed an acceptable fit ($\chi 2/df = 3.13$;CFI = 0.98; SRMR = 0.03; RMSEA = 0.06). Factor loadings of the items can be seen in Figure 2.

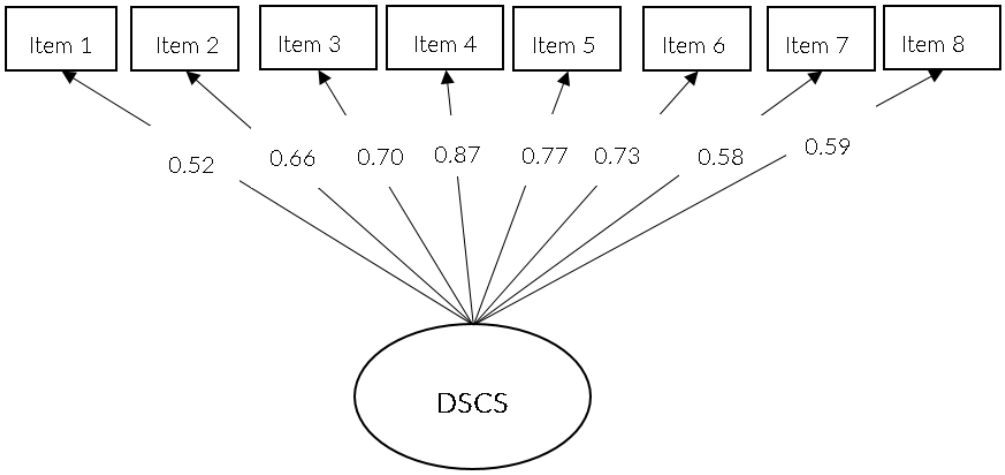


Figure 2. *Single-Factor DFA Model of the DSCS*

GENDER COMPARISONS

We calculated a one-way multivariate analysis of variance (MANOVA) to test gender differences between men and women in DSC subscale scores. The results showed that there was no statistically significant difference between males and females ($\lambda = .991$, F [df = 4,493] = 1,126 p = .344).

Furthermore, we performed a t-test to test gender differences between men and women in DSCS scores. According to the results, there was no statistically significant difference between men and women (t (496) = 1.058, p = .290). (Cohen's d = 0.01).

4 | DISCUSSION & CONCLUSION

The objective of the present study was to evaluate the psychometric properties of Turkish versions of two self-control scales including DSC developed by Ein-Gar and Sagiv (2014), and DSCS developed by Uziel and Baumeister (2017). Self-control is an old-age concept in the existing psychology literature. Therefore, numerous self-report scales were developed and adapted to assess the level of self-control such as the Self-Control Schedule (Rosenbaum, 1980), Delay of Gratification (Mischel et al., 1989), Low Self-Control Scale (Grasmick et al., 1993), Eysenck Impulsiveness Questionnaire (Eysenck et al., 1984), Brief Self-Control Scale (Tangney et al., 2004), Self-Discipline Scale (NEO-PI-R; McCrae & Costa, 2004), Stop and Start Control Scales (de Boer et al., 2011), and Self-Discipline Scale (Şimşir & Dilmaç, 2021). However, these instruments have minor differences as well as common points. Hence, researchers have given substantial attention to the measurement of self-control and related constructs and addressed diversities of these instruments (Duckworth & Kern, 2011; Hagger et al., 2018). On the other hand, researchers addressed the validity of these instruments' different national groups (Hagger et al., 2018). In this vein, our study results confirm the validity of self-control scales in different national groups (e.g., Turkish sample). Our results indicated that all two self-control scales had satisfactory ($\alpha \geq .70$; $\omega \geq .70$) reliability coefficients among the Turkish college students sample (Tabachnick & Fidell, 2015). The results of the confirmatory factor analysis showed that all two self-control scales yielded satisfactory model fit based on the criteria proposed by Kline (2019). Additionally, the relationship between the sub-dimensions of the self-control scale (self-discipline and impulsivity) and all self-control scales supported convergent and discriminant validity. We have presented below the comparison of these scales with the original versions and their psychometric properties.

First, the CFA results for DSC (Ein-Gar & Sagiv, 2014) revealed preliminary evidence for the use of the Turkish sample in evaluating the concept of dispositional self-control in Turkey. The CFA is required to eliminate one item from the Turkish version of the DSC, due to the low factor load coefficient ($\lambda < .30$) (Büyüköztürk, 2012). A low factor loading coefficient in the DSC is likely related to meaning loss in translation or a divergent sense of self-control in the Turkish language and traditions. Additionally, a comparison of the structure analysis map of DSC with the Turkish form of DSC's CFA results demonstrates that both of them have a similar structure in terms of sub-dimensions and item loads. In sum, our results parallel with the original form of DSC as four sub-

dimensions including 16 items. The four sub-dimension of the DSC involves yielding to not doing right temptations, overcoming not doing right temptations, yielding to doing wrong temptations, and overcoming to doing wrong temptations. While doing wrong temptations items related to impulsive and self-indulgent actions, not doing right temptations related to delaying gratifications for future goals. In addition, these sub-dimensions did not differ in terms of gender.

Second, the CFA results of DSCS (Uziel & Baumeister, 2017), which measures peoples' wish for self-control, demonstrated an acceptable model fit in the Turkish sample. The factor loadings of the items of the original form of the DSCS ranged from .74 to .87 (Uziel & Baumeister, 2021). Although the factor loadings of the CFA results of the Turkish version of the DSCS are lower, they are very similar to the original form. Briefly, our results parallel with the original version of DSCS which was indicated as a single-factor model including eight items. Additionally, the structure of DSCS did not differ between men's and women's samples. The consistencies between the English and Turkish versions of the DSCS showed that the perception of desire for self-control is likely similar in both languages and samples.

LIMITATIONS AND FUTURE RESEARCH

Although the results of the present study provide strong evidence for the validity and reliability of DSC, and DSCS among Turkish populations, the limitations of the study should also be considered. First, despite our sample consisting of college students living in 48 different provinces of Turkey, it isn't adequate to generalize our results to the general all adult population. Accordingly, there is a need for studies with larger and more heterogeneous groups to generalize the results. Second, we couldn't examine test-retest reliability to evaluate the stability of the level of self-control over time. Future studies may compensate for this limitation by investigating the level of trait self-control in the progress over time. Third, as our instruments are self-report scales, participants may answer the questions in a careless or biased manner. Therefore, it may be useful for researchers to use other instruments such as semi-structured interview forms with these scales. Finally, the results of the present study provided preliminary evidence. We recommend that researchers maintain to test the psychometric properties of self-control scales in future studies.

CONCLUSION

Despite the limitations mentioned above, the results of the study demonstrated that the Turkish version of DSC, and DSCS has satisfactory psychometric properties to measure self-control among the adult population. As far as we know, this is the first adaptation study that the validity and reliability of DSC, and DSCS in Turkey. Taken together, our results would extend prior literature and confirmed the usefulness of the two different self-control scales in Turkish culture.

STATEMENTS OF PUBLICATION ETHICS

We declare that the study has no unethical problems and ethics committee approval was obtained from Necmettin Erbakan University Scientific Research Ethics Board (Meeting Date: 13.11.2020, Decision No: 2020/87).

RESEARCHERS' CONTRIBUTION RATE

The authors listed contributed to data analysis and manuscript writing. Author order reflects the weight of these contributions.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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APPENDIX I

Items of Dispositional Self-Control Scale (DSC) (Öz-kontrol Eğilimi Ölçeği)

	1	**2**	**3**	**4**	**5**
1.Hoşuma gitmeyen görevleri tamamlamayı erteleme eğilimindeyim.*	1	2	3	4	5
2.Yapmam gereken görevleri bazen çok geç oluncaya kadar erteliyorum.*	1	2	3	4	5
3.Daha az önemli işler yapmam gerektiğinde, onları genellikle son dakikaya kadar erteliyorum.*	1	2	3	4	5
4.Çok baskı altında ve aşırı iş yüküm olsa bile insanlar programa uyma konusunda bana güvenebilirler.	1	2	3	4	5
5.Meşgul olsam bile yapılması gereken işleri asla geciktirmem.	1	2	3	4	5
6.Sinir bozucu olsalar bile görevlerimi hemen bitirme eğilimindeyim.	1	2	3	4	5
7.Yol boyunca cezbedicilere direnerek uzun vadeli hedeflerim için etkili bir şekilde çalışabilirim.	1	2	3	4	5
8.Canım yapmak istemese bile tüm görevlerimi zamanında bitirmek benim için önemlidir.	1	2	3	4	5
9.İnsanlar çoğu zaman düşünmeden karar verdiğimi söyler.*	1	2	3	4	5
10.Birçok şeyi düşünmeksizin anında yapıyorum.*	1	2	3	4	5
11.Genellikle tüm alternatifleri düşünmeden hareket ederim.*	1	2	3	4	5
12.Sıklıkla kendiliğinden (spontane) ve biraz aceleci kararlar veririm*	1	2	3	4	5
13.Heyecan verici bir şey yaşadığımda bile duygularıma kapılmam veya düşünmeden hareket etmem.	1	2	3	4	5
14.Stresli olduğum zaman bile aldığım kararların çoğu dikkate alınır ve hesaba katılır.	1	2	3	4	5
15.Bir şey beni baştan çıkardığında genellikle dayanmayı başarırım.	1	2	3	4	5
16.Cezbedici şeylerin üstesinden gelmeyi genellikle başarırım.	1	2	3	4	5

APPENDIX II

Items Desire for Self-Control (DSCS) (Öz-kontrol Arzusu Ölçeği)

	1	**2**	**3**	**4**	**5**
1.Daha öz-disiplinli olmak istiyorum.	1	2	3	4	5
2.Görevlere daha iyi konsantre olabilmek istiyorum.	1	2	3	4	5
3.Stresli durumlarda verdiğim tepkiler üzerinde keşke daha fazla kontrol sahibi olsaydım.	1	2	3	4	5
4.Cezbedicilere daha iyi karşı koyabilmek istiyorum.	1	2	3	4	5
5.Kötü düşünceler aklıma geldiğinde onları daha iyi kontrol edebilmek istiyorum.	1	2	3	4	5
6.Keşke istenmeyen alışkanlıklarımı değiştirmede daha yetenekli olsaydım.	1	2	3	4	5
7. Duygularım üzerinde daha fazla kontrol sahibi olmak istiyorum.	1	2	3	4	5
8. Hedeflerimin peşinden giderken daha ısrarcı olmak istiyorum.	1	2	3	4	5

Not: Ölçeklerde * ile işaretlenen maddeler ters maddelerdir.

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Pair Programming Experiences of Prospective Information Technologies Teachers

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ABSTRACT

This study aims to reveal the experiences of undergraduate students regarding a pair programming method used in their programming course. Qualitative and quantitative methods were used to collect data for the study. The pair programming method required students to work in pairs throughout the semester. The participants of the study consist of 22 sophomores from computer education and instructional technologies department enrolled on the programming languages course. Collaboration Experiences, Team Member Evaluation, and Self-Assessment forms and a semi-structured interview form were used to collect data. The findings indicate that all the students were positive about the course. According to the students, collaboration within pairs was carried out successfully. At the end of the course, students stated that the lessons were sufficient for programming, and they achieved a good performance. In addition, the students were satisfied with the collaboration of their partner and the opportunities they had to improve their communication skills thorough pair programming. In addition, students emphasized that pair programming reduced the instructor's workload. However, a few students also stated that the process had some limitations. The findings of the study will be useful particularly for instructors while designing programming education.

Keywords: Computer Education and Instructional Technologies, CEIT, prospective information technologies teachers, pair programming, programming education, collaborative learning

Bilişim Teknolojileri Öğretmen Adaylarının Eşli Programlama Deneyimleri

ÖZ

Bu çalışma, üniversite öğrencilerinin, programlama dersinde kullanılan eşli programlama yöntemine ilişkin görüş ve deneyimlerini ortaya çıkarmayı amaçlamıştır. Çalışmada veri toplamak için nitel ve nicel yöntemler kullanılmıştır. Eşli programlama yöntemi ile öğrenciler dönem boyunca ikili olarak çalışmışlardır. Araştırmanın örneklemini eğitim fakültesi lisans programı olan programlama dilleri dersine kayıtlı 22 ikinci sınıf bilgisayar ve öğretim teknolojileri eğitimi (BÖTE) öğrencisi oluşturmaktadır. Verileri toplamak için "İşbirliği Deneyimleri", "Takım Üyesi Değerlendirme" ve "Öz Değerlendirme" formları ile yarı yapılandırılmış görüşme formu kullanılmıştır. Bulgular, tüm öğrencilerin ders hakkında olumlu görüşe sahip olduklarını göstermektedir. Öğrencilere göre işbirliği bu yöntemle başarıyla gerçekleştirilmiştir. Ders sonunda kodlama konusunda yeterli olduklarını ve iyi bir performans elde ettiklerini belirtmişlerdir. Bunun yanında öğrenciler, takım arkadaşlarının işbirliğinden memnun kalmışlar ve eşli programlama ile iletişim becerilerini geliştirme imkanı da bulmuşlardır. Ayrıca bu yöntemle eğitmenin iş yükünün de azaldığını belirtmişlerdir. Ancak az sayıda öğrenci sürecin bazı sınırlılıklarının olduğunu da belirmiştir. Çalışmanın bulguları özellikle programlama öğretiminin tasarlanmasında öğretim elemanları için faydalı olacaktır.

Anahtar kelimeler: Bilgisayar ve Öğretim Teknolojileri Eğitimi, BÖTE, bilişim teknolojileri öğretmen adayları, eşli programlama, programlama eğitimi, işbirlikli öğrenme

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1 | INTRODUCTION

In the 21st century, knowledge of computer science has become a key skill for adapting to the digital world (McManus & Costello, 2019). Therefore, today's education systems need to provide students with this skill (Demir & Seferoglu, 2021). Learning programming is a fundamental step in computer science education as it involves skills such as algorithmic thinking, problem solving, and designing, all of which are necessary for the future workforce (Witherspoon et al., 2016). However, for decades, students have failed to succeed in this area (Raigoza, 2017). Novice programmers in particular have difficulty learning the fundamentals, struggle to succeed, and often finally give up (Denner et al., 2021; Falloon, 2016). This is because programming includes syntax and how to set up logical structures (Korhonen & Malmi, 2000), requiring novice learners to develop advanced skills and learn syntax at the same time. This makes the learning process difficult and confusing for learners (Koulouri et al., 2014). A constructivist approach would be useful for learners to help them establish connections between the knowledge and skills they learn during the learning process. Learner-centered programming education needs to be provided, especially for novice learners, in which they make progress based on their own knowledge gained during the process. The research shows that programming needs both willingness and programming knowledge (Denner et al., 2021). It would be beneficial for learners to be supported in tasks that require them to use high-level skills such as analysis, constructing algorithms and coding in order to finally succeed (Falloon, 2016; Hwang et al., 2012). With collaborative learning, learners have the opportunity to better develop their problem solving skills and cognitive abilities by both receiving support and expressing their own ideas (Bernard & Bachu, 2015; Kuhn, 2015). Thus, programming education supported by collaborative learning is quite successful and increases learning performance (Preston, 2005). In addition, while learner self-confidence tends to be low in traditional programming education (Bravo et al., 2005), it increases in collaborative environments, helps them become more successful (Hwang et al., 2012) and enables learners to reach their goals in a shorter time by focusing more deeply (Williams et al., 2003).

For teaching programming, pair programming based on collaborative working is important in addressing learners' needs (Cao & Xu, 2005). With pair programming, students collaborate each other and solve the problems with their partner's support (Liebenberg et al., 2012). Two learners work on one computer, design a programming strategy, and develop software (Hanks et al., 2011; Williams et al., 2003). In this way, with two learners working on the same task rather than one, they arrive at more productive ideas and progress better (Beck & Gamma, 2000). In addition, the programming education is conducted in a planned way, and each individual fulfils their tasks in accordance with the role assigned to them. Within the pairs, each learner has different responsibilities (Campe et al., 2020): driver and navigator. The driver develops code while the navigator observes the driver, identifies any problems, develops a strategy, and comes up with solutions for any errors (Williams et al., 2000). Through the process, the pairs swap responsibilities so that both partners become involved in the brainstorming process (Tsan et al., 2020; Wei et al., 2021). In this way, a more efficient teaching environment is created that doesn't focus primarily on syntax and coding (Satratzemi et al., 2021). Sherriff (2017) highlighted the importance of pair programming in his study because this method improves retention and programming confidence, ensures better performance on exams and projects. In this study, Sherriff developed a form to examine in-depth, emphasizing that the attitudes of the students as an important variable in the "Computer Science 1" course using the pair programming method with 500 students. This form is also used in the present study. Braught et al. (2011) used this method to improve the programming skills of high school students and found that in pairs, students are more successful and more likely to complete the process than those who do programming on their own. In addition, as the learners make fewer mistakes in this process (Zacharis, 2011), the method enables them to be more effective and productive (Hannay et al., 2009). In their research with university students, McDowell et al. (2006) concluded that with pair programming, students continue to program for a longer period of time. In addition, pair programming supports learners socially as learners have the opportunity to improve their communication skills (Faja, 2011) and increase their interaction (Howard, 2006).

Research has shown that university students experience many problems in introductory programming courses. As we have seen, these courses, provided by many departments, are important for students' future careers (Witherspoon et al., 2016). However, despite the difficulties many students face, universities have continued to provide traditional educational methods, only giving importance to programming and syntax (Iqbal Malik, 2016; Vihavainen et al., 2011). In such an environment, learners have difficulty turning what they have learnt into

experience using programming structures and developing strategy; they often lack practical knowledge and fail to fully grasp the logic of programming (Bruhn & Burton, 2003).

The pair programming method, which is presented as a solution to this problem, makes the programming learning process more effective (Zhong et al., 2016). Dongo et al. (2016) tried a lab experiment including advanced programming with undergraduate students enrolled on Management Information Systems (MIS). The research showed that the students were more confident and successful. Another study observed that university students were more motivated by this method, resulting in them completing the process more successfully (Mentz et al., 2008). The method also helped university students develop reasoning skills (Othman et al., 2019) and they enjoyed the course more (Cliburn, 2003). Vasconcelos and Kim (2020) carried out a similar study teaching programming in teams with preservice teachers. The research concluded that the students learned programming better by brainstorming together. What is more, as Cliburn (2003) states, the burden on instructors decreased.

Despite the research referred to above, all aspects of the effects of pair programming still need to be investigated. Some studies have highlighted the limitations of pair programming. Balijepally et al. (2009) carried out a pair programming method with entry level university students on an information systems course. The research found that the less experienced partners made progress, but the more expert partner failed to make progress. In addition, a few studies have observed further success with this method (Chigona & Pollock, 2008; Hanks et al., 2004). While the effects of pair programming are mostly beneficial, some studies found that expectations were not fully reached. As mentioned above, university students have serious difficulties in learning programming. Although this issue has been studied for many years, there are still failures (Hanks et al., 2011). Pair programming, on the other hand, provides students with more confidence (Braught et al., 2011; Werner et al., 2004), increases their satisfaction and communication levels (Dongo et al., 2016), increases their high-level learning (Othman et al., 2019) and it is seen as an important method in programming education. Therefore, pair programming requires further research and the benefits and limitations of applying such a method need to be explored more extensively. This study will make an important contribution to the literature by revealing university students' in-depth evaluation of their own and their partner’s performance during the process.

RESEARCH QUESTIONS

The aim of the research is to reveal the experiences of university students in the pair programming process and seeks answers to the following research questions:

1. What is the collaborative experience of students in the pair programming process?
2. How do students evaluate themselves in the pair programming process?
3. How did students evaluate their partners in the pair programming process?

2 | METHOD

The aim of this study is to reveal the experiences of undergraduate students regarding the pair programming method. Creswell (2012) suggests that it would be better to use both quantitative and qualitative methods together in understanding the research problem. Therefore, this study includes both quantitative and qualitative means was used in the study to reveal the opinions and experiences of students. While the quantitative part included forms the qualitative part of the study used semi-structured interviews. The pair programming method was used in a programming course in which students worked in pair for a semester. Students completed assessment forms after each lesson. The courses were taught face to face in a computer lab for 14 weeks. The course is a basic programming course and the topics are algorithm, flowchart, basic concepts, variables, conditional expressions, operators, loop, array, methods. C# was used as the programming language. Google classroom was used for out-of-class sharing, submitting homework, and for questions and answers. Lecture notes, activities (exercises), and lecture presentations were shared each week. In addition, one-on-one interviews were conducted at the end of the semester for in-depth analysis.

PARTICIPANTS

Purposeful sampling was used in the study. The study involved 22 sophomore students of the Faculty of Education Computer Education and Instructional Technology Department on the Programming Languages 1 course.

13 of the participants of the study were female and 9 were male. The distribution of their ages was 21. A total of 7 students, 2 males and 5 females, participated in the qualitative part of the study. All were taking the course for the first time and all were computer literate. Pairs were formed at the beginning of the semester. Students are allowed to form their own groups so that they could choose to be with the friends they felt able to work with as it is not motivating to work with someone they would choose not to. This allowed them to work in a pair with a friend with whom they work generally work with during the course. Evidence of the benefit of this way of working is presented in Choi (2015)'s study. The author states that female and male students have different characteristics. Because they express themselves differently, females in particular prefer being in same gender pairs. In addition, the study emphasizes that females stated that they felt more comfortable and were able to communicate more openly when working with another female.

Two students worked collaboratively at one computer. One student was the driver and the other the navigator, so, for example, while the driver did program writing or coding, the navigator was involved in strategic thinking and guiding. The course is given by an instructor in a natural course environment. This instructor provided feedback and guidance to the students in all necessary situations and walked around monitoring the students during the lesson and the practice. The content of the course included basic concepts about computers and software, algorithm, flow charts, variables, constants, arithmetic operators, logical operators, control structure, if/else, switch/case, loops, break-continue, while, do-while, randomize, arrays, methods (functions), parameters, return (returning a value) and activities about them. Activities, from easy to difficult, are presented to reinforce these topics. Number puzzles, simple games, quiz preparation, automations are examples of activities.

INSTRUMENTS

Collaboration Experiences, Self-Assessment, and Team Member Evaluation forms were used in the research. The questions on the forms were adapted from Sherriff's (2017) study. The necessary permissions were obtained. In addition, a semi-structured interview form was prepared by the researchers for one-on-one interviews. Three educational technology expert opinions were taken for the forms and interview questions, and a pilot application was carried out. After the forms were finalized, they were distributed to the students.

Collaboration Experiences form: This consists of a total of 15 questions, two of which are open-ended and 13 of which are 5-point Likert-type questions, for example, "When I work with my partner, I feel responsible for his or her success. It saves time working with my friend while doing homework, I prefer to work with my friend on homework." Cronbach's Alpha was calculated as .79 which is appropriate.

Team Member Evaluation form: This consists of a total of 10 questions, one of which is open-ended and 9 of which are multiple-choice. For example, "Does the student make an effort to collaborate in the pair? Evaluate how compatible you and your partner are." Cronbach's Alpha was calculated as .82 which is appropriate.

Self-Assessment form: This form consists of a total of 11 questions, one of which is open-ended and 10 which are multiple-choice questions. For example, "When you have homework, when do you start? When you are working on a programming assignment, what do you think about? Did you study enough for your lesson?" Cronbach's Alpha was calculated as .81 which is appropriate.

Semi-structured Interview form: This form consists of 7 open-ended questions. For example, "What are your positive/negative experiences with pair programming? How was your communication with your partner during the pair programming process? Did you feel like a part of the pair during the process?"

DATA COLLECTION AND ANALYSIS

Participants were informed about the purpose of the study, the study instruments, and that it was voluntary involvement. The data collection process included the participants filling out the relevant forms and conducting one-on-one interviews. Participants filled the forms over a period of 9 weeks. It took approximately 30 minutes for the participants to fill out three forms. At the end of the term, semi-structured interviews lasting approximately 20-25 minutes were held with each participant.

Data analysis was done using SPSS 21 and Excel. Descriptive statistics were used. In addition, content analysis was applied to the qualitative data. During this process, the data obtained from the interviews, which is the first

stage of content analysis, was first categorized under certain codes. In the second stage, six themes were created covering these codes. The resulting codes and themes were tabulated. The frequency of the codes was added in Table 4. In order to ensure reliability of the study, two researchers analyzed the data obtained (Merriam, 2015). A hundred percent agreement was achieved between the researchers. In addition, the opinions of two field experts were taken of the codes and themes. After revisions, the final table was obtained (see Table 4). In addition, some notable student statements are included. The male and female participants were coded as M1, M2, F1, F2, F3, F4, F5.

3 | RESULTS

The aim of the research is to reveal the experiences of university students in the pair programming process. In this context, answers to the research questions were examined.

RQ1: COLLABORATIVE EXPERIENCES

As can be seen in Table 1, both the weekly means and the total means of the items are above 2, showing that students can work collaboratively. Although the total means of the scale vary according to the weeks, all means are above 2 and the average of the total means is above 3 (M=3.31, SD=0.33). Considering the total means of the items, Item 1 (M=2.93, SD=0.73) scored the lowest mean while Item 7 (M=3.95, SD=0.51) scored the highest mean. Accordingly, it can be said that the students do not feel responsible for the success of their friends and they get a lot of help from their friends while solving a difficult problem. 4, 8, 9th weeks have relatively low means. It can be said that they had difficulty in working collaboratively because they had difficulties in the problems in those weeks.

Table 1. Collaborative Experiences of Students

	Means of Weeks									Total	
Items	1	2	3	4	5	6	7	8	9	M	SD
1. When working with my partner, I feel responsible for her/his success.	3.64	3.20	3.22	2.00	3.00	3.67	3.60	2.00	2.00	2.93	0.73
2. Working with my friend while doing homework saves time.	3.88	3.50	3.67	2.00	3.67	3.33	3.75	2.00	2.00	3.09	0.83
3. I prefer to work on homework with my friend.	3.75	3.29	3.56	2.50	4.00	3.50	3.60	2.00	2.50	3.19	0.68
4. I prefer to work alone on large projects.	2.64	3.00	3.00	3.50	3.00	3.00	3.00	3.50	3.50	3.13	0.30
5. I learn more while working by myself.	3.25	3.57	3.56	4.00	3.33	3.25	3.80	4.00	4.00	3.64	0.32
6. I am more organized when doing homework with others.	3.81	3.33	3.67	3.00	3.67	3.50	4.00	1.50	3.00	3.28	0.75
7. When solving a difficult problem, I seek advice from my friends.	4.38	4.14	4.22	3.50	4.33	4.50	4.00	3.00	3.50	3.95	0.51
8. If I was paired with my friend, I could avoid coding bugs.	3.40	3.20	3.56	2.50	4.00	3.75	3.25	2.50	2.50	3.18	0.57
9. I have a tendency to procrastinate when working on my own.	3.44	3.13	3.33	2.50	2.00	4.00	3.60	2.50	2.50	3.00	0.65
10. If I had a choice, I would always work alone.	2.56	3.14	3.22	4.00	2.67	2.75	3.40	3.50	4.00	3.25	0.53
11. I get new ideas about problem solving from my friends.	4.13	4.07	4.00	2.50	4.33	4.25	4.00	3.50	2.50	3.70	0.72
12. If I am matched to work with a friend and this person is slow, I tell the course lecturer.	3.56	3.36	3.78	2.50	3.00	3.00	4.00	3.50	2.50	3.24	0.53
13. When I explain my logic to my partner, I sometimes find faults in my thinking.	3.13	3.33	3.78	3.50	3.50	3.75	3.40	3.00	3.50	3.43	0.26
Total	3.50	3.41	3.58	2.92	3.42	3.56	3.65	2.81	2.92	3.31	0.33

RQ2: Self-Assessment of Students

It can be seen from Table 2, more than half of the students (n=16, 72.7%) start their homework in the middle of the allocated time. 63.6 percent of the students (n=14) think that they are slower than others in programming. 77.3 percent (n=17) stated that they had no difficulty in starting to solve the programming problem and that they found computer science topics interesting. While almost all of them (n=21, 95.5%) stated that they liked to code, almost all of them (n=20, 90.9%) stated that they knew they would find the answer somewhere when faced with a problem.

Table 2. Students' Self-assessment

Questions	Answers	n	%
When you have homework, when do you start?	Too early	5	22.7
	Too late	1	4.5
	In the middle	16	72.7
When working on a programming assignment, what do you think about?	I am faster than others at solving programming tasks.	8	36.4
	It takes me longer to do programming tasks than my classmates.	14	63.6
When working on a programming problem:	I have no trouble starting to solve the problem.	17	77.3
	I don't know where to start solving new programming problems.	5	22.7
Regarding computer science topics I've seen so far:	Not all computer science topics I've seen so far have piqued my interest.	5	22.7
	I've found all computer science topics interesting and intriguing so far.	17	77.3
Regarding coding:	I hate coding.	1	4.5
	I love coding.	21	95.5
Did you study enough for your lesson?	I got the best grade I could get	12	54.5
	I only worked one-on-one	10	45.5
When helping others with computer science, you:	I know I can help others.	14	63.6
	I feel like I don't know enough to help others.	8	36.4
After the exam with computer science	I think I did badly.	8	36.4
	I think I'm doing very well	14	63.6
When I encounter an obstacle while thinking	My mind wanders to other things.	2	9.1
	I know I will find the answer somewhere.	20	90.9

RQ3: Experiences with Team Member

As can be seen from Table 3, it is seen that the feedbacks of the students about their teammates are mostly positive. Half of the students (n=11, 50%) stated that their teammates always attend the meeting, they always inform if they cannot attend the meeting, and they put a lot of effort into the homework given before the meeting. All of the students stated that their teammates usually or always both try to do what they can do and make an effort to cooperate.

Table 3. Student Experiences with their Team Member

	Never		Rarely		Sometimes		Usually		Always	
	n	%	n	%	n	%	n	%	n	%
Did the student attend pair meetings?	1	4.5	1	4.5	2	9.1	7	31.8	11	50
Did the student inform their partner if they were unable to attend a meeting or fulfil a responsibility?	2	9.1	-	-	3	13.6	6	27.3	11	50
Did the student put in a serious effort on the assignment given before the pair meetings?	1	4.5	-	-	5	22.7	5	22.7	11	50
Did the student try to do what they can do in pair meetings?	-	-	-	-	-	-	7	31.8	15	68.2
Did the student make an effort to collaborate in the pair?	-	-	-	-	-	-	6	27.3	16	72.7

In addition to quantitative data, the opinions of the students regarding the paired programming method applied in programming education were taken through interviews. The qualitative data was converted into specific codes and these codes were categorized under the relevant themes. Then, the tabulation process was done in a systematic way. The relevant data is in Table 4.

Table 4. Students' Opinions of Pair Programming

Theme	Code	f
Collaboration	Complementing each other in missing points	7
	Providing support	2
	Solving the problem together	4
	Discovering new solutions with a different perspective	2
	Brainstorming	4
Academic Support	More efficient	3
	Faster learning and solving problems	2
	Facilitating the solution process by talking about each other deficiencies	1
	Retention of information	2
	Rising academic performance	4
	Keeping active	2
	Decreasing anxiety	1
	Rising motivation	3
	Rising self-confidence	2
Communication	Good	7
	Improving communication skills	2
	Increasing communication with the instructor	4
	Decreasing the need for the instructor	1
	No change in communication with the instructor	1
	Increased communication with partner	7
	Increased understanding of the partner	3
	Started paying attention to ideas	1
	Felt their opinions mattered	1
	Partners understand each other clearly	2
	Felt like a part of the pair	7
Other	Feeling inadequate in the course subjects that both peers do not know	1
	Prolongation of the process due to disagreement	1
I prefer to work in pairs		7
I would like to benefit from pair-programming in the future		7

All of the students in the study had a positive approach toward pair programming. The codes generated from the research data were grouped under the themes of collaboration, academic support, communication, other, and preferring to pair-programming today and in the future. Under collaboration, the students stated that they provided the opportunity to complement each other in missing points (f:7). Secondly, it was stated that an environment of solving the problem together (f:4) and brainstorming (f:4) was formed. These statements were followed by providing support (f:4) and discovering new solutions with a different perspective (f:4). Noteworthy statements on the topic are as follows.

F1: "… *The exchange of information we made with each other during the learning process, the fact that we offered different solutions to each other for problem solving, helped me to gain different perspectives on problems and solutions in programming languages, and when I took into account my friend's suggestions for solutions, it*

helped me to say, "yes, it could be solved this way, I was writing the codes in a longer way" etc. and to create new suggestions for solutions."

F2: "*Since we were paired, we understood the problems better in the form of question and answer. We got instant feedback by asking each other questions. Since we were pairs, we had the opportunity to brainstorm. This helped us to express ourselves more easily. In this way, it enabled us to solve the problems that we encountered later more easily and from different perspectives*."

These statements show that the students obtained new solutions together by working collaboratively and benefiting from the brainstorming method and that this process works in a healthy way.

Another issue that students focused on was the academic support provided by the process. Here, students stated that their academic performance increased the most (f:4). In addition, students stated that their motivation (f:3) and the efficiency of the lesson increased (f:3). In addition, they learned and created solutions faster (f: 2), their learning was permanent (f: 2), the lesson was kept active (f: 2), their self-confidence increased (f: 2), the problem-solving process became easier by talking about each other deficiencies (f:1), and their anxiety reduced (f:1). Example statements on these issues are as follows;

F1: "*By talking, you can obtain different perspectives and solutions that your friend has built in his/her mind. In this process, I think that I expressed myself well and expressed my own solution proposals clearly*."

F5: "*We can get a different experience that is completed faster and easier and I can get many solutions.*"

M1: "*When you work with a friend, he/she tells you your weaknesses and you correct them. In this regard, you also gain self-confidence*."

M2: "*Knowing that I am not alone and my friend's thinking about the solution increases my motivation.*"

Communication in pair programming is another theme that the students mentioned. According to the data, all of the students stated that good communication was provided, their communication with their partner increased, and they felt themselves as a part of the pair (f:7). In addition, they stated that their communication with the instructor increased (f:4) and their understanding of their partner improved (f:3). The improvement of students' communication skills (f:2), understanding each other clearly with the partner (f:2), the decrease in the need for instructors (f:1), starting to give importance to ideas (f:1), and feeling that their ideas are important (f:1) were seen as other benefits of the pair-programming method. One student stated that his communication with the instructor did not change. Noteworthy statements on the topic are as follows:

F5: "*It allowed me to consult my friends and teachers more easily in problem sentences in the programs given to me later on. I started to evaluate from their point of view. In this way, I was able to obtain many different solutions*."

F2: "*My communication skills increased and I started to be more understanding and helpful*."

In addition, the students also stated limitations related to the method. These topics are grouped under the "other" heading. These are feeling inadequate in the course subjects that both peers do not know (f:1) and the prolongation of the process due to disagreement between peers (f:1). The following is an example statement: M2: "*Differences of opinion cause loss of time and motivation*". Finally, all students stated that they prefer to work with pairs in a programming lesson and they want to benefit from pair programming in their future careers (f:7).

As a result, with pair programming, students achieved better programming performance by working collaboratively and producing new and faster solutions to problems together. In this way, their motivation may increase during the process, which would help them feel more self-confident. In addition, their communication with their partners and instructor improved. Very few problems were experienced. At the end of this whole process, the students stated that they preferred pair programming and that they intend to use it in the future. In this respect, the process has been found to be beneficial.

4 | DISCUSSION AND CONCLUSIONS

In this study, students formed pairs within the scope of pair programming and under the guidance of an instructor. The pairs developed programs by working on the same project. According to the findings, the students felt that they could successfully work in a collaborative way (Satratzemi et al., 2021). Students did not feel responsible for the success of their partner. In this respect, it would be beneficial to provide an environment where students can empathize with each other.

Secondly, students were asked to evaluate themselves regarding the process. All of the students evaluated themselves positively and found themselves competent in programming. Since learning and interaction are closely related (Yildiz Durak, 2018), interaction is thought to be effective in achieving course objectives. Of the topics they studied, they felt they were most sufficient in coding. However, the number of students who had the impression that their partner progresses faster in programming or solving problems than they did is very high.

Another area of investigation in this research was students' experiences with their partner. The results show that students were satisfied with their partner. However, students also stated that there were problems in participating in pair meetings. To ensure active participation in pair meetings, instructors should meet with them from time to time to both motivate them both and control the process. The research shows that the students were prepared for pair work before the pair meetings and that they made an effort in this regard. In addition, students stated that their partner made an effort to collaborate. This finding supports the conclusion that they can successfully carry out the pair programming process.

The research also shows that students thought they achieved better academic performance (Dongo et al., 2016) and produced new and faster solutions to problems with their partners (Beck & Gamma, 2000). In addition, while solving the problems together, they completed each other's missing information. Owing to their partners, the students gained a different perspective and they were able to make their knowledge permanent through more effective learning. Also, they remained active in the course and their motivation for programming increased (Mentz et al., 2008). The students in the pair-programming course conducted by McDowell et al. (2006) continued programming for longer periods of time. It is possible that this is due to an increase in student motivation.

Another finding was that during pair programming, students were able to benefit from each other's ideas and improve their productivity skills by brainstorming (Tsan et al., 2020; Wei et al., 2021). In addition, the anxiety they felt at the beginning of the process decreased and their self-confidence increased. These findings are in line with the results of another study, Dongo et al. (2016), with university students, which observed that students are more successful and are more self-confident in pair programming. Information about the communication processes of the students was also obtained. According to the findings, students' communication with both their partners and instructor improved. In addition, their understanding of their partner increased and they developed in valuing ideas mutually. In this way, they were able to see themselves as part of the pair. Similarly, Faja (2011) states that learners found an environment to improve their communication skills and gained support through social media. In this way, learners can be involved in more interaction (Howard, 2006). On the other hand, a few students mentioned some limitations. One limitation was that the students could not progress when both partners failed to produce a solution. Another was that students sometimes disagreed about the solution to a problem. In their studies, Chigona and Pollock (2008) and Hanks et al. (2004) found that higher success was not achieved in pair programming as expected. This may be due to the limitations of the research or other problems. For a better process, the instructors should encourage their students to consult them in case of problems. In addition, pair programming was seen to reduce instructors' workload (Cliburn, 2003). This would enable instructors to allocate more time to students with problems. Finally, the students stated that they were satisfied with pair programming, want it to be applied again, and may use this method in the future when appropriate.

At the end of the process, the students are motivated, have self-confidence, communicate well, and, therefore, developed their programming skills. One of the biggest problems experienced by individuals in programming education in general is that many tasks need to be completed and that students often fail and leave the course (Denner et al., 2021; Falloon, 2016; Koulouri et al., 2014; Raigoza, 2017). The findings of this research suggest that pair programming may be an effective alternative teaching method in programming education in solving many of the existing problems. In literature, there are a few studies that resulted further success with this method

(Chigona & Pollock, 2008; Hanks et al., 2004). The study revealed university students' evaluation of their own and their partner's performance elaborately. In future research, this method can be tested with a larger group of students. In addition, different possible effects of pair programming can be examined in terms of individual differences such as personality type and learning preference. Some students may progress faster than their partners, and this may not positively affect the other partner. To address this, the instructor may monitor the pairs to identify those students having difficulties and offer further guidance. In addition, extracurricular activities should be done to create team spirit in order to adapt to the process. This study and studies in the literature have also shown that negative situations can occur, albeit in small numbers. Observing larger groups by taking into account their individual characteristics may help to address any deficiencies by better clarifying the problems that arise in pair programming. Many teaching approaches used compatible with programming education in the field. In future research, pair programming can be compared with different teaching approaches such as cooperative learning (Garcia, 2021), programming in the context of digital stories (Burke, 2012; Zha et al., 2020), the use of tools such as Scratch (Bean et al., 2015; Burke, 2012; Kalelioglu, & Gülbahar, 2014).

STATEMENTS OF PUBLICATION ETHICS

Istanbul University - Cerrahpasa's ethical committee were approved the data collection procedures and the study was recruited by following the ethical standards with 15153 ID.

RESEARCHERS' CONTRIBUTION RATE

Author 1: Conceptualization; Literature study; Investigation; Reporting; Original drafting, reviewing and editing

Author 2: Conceptualization; Methodology; Running the project; Original drafting, reviewing and editing

CONFLICT OF INTEREST

Authors declare no competing interests.

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Gifted and Talented Students' Views on Engineering Design-Oriented Integrated STEM

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ABSTRACT

This research aims to present gifted and talented students' views regarding STEM (science, technology, engineering, mathematics) education and STEM disciplines in engineering design-oriented integrated STEM activities. The research was modeled as a case study, using a qualitative research design, and was conducted with seven 7th grade students, who were getting support education at Yozgat Science and Art Center. Individual interviews were conducted to reveal the views and definitions of students about STEM disciplines before STEM activities. During implementation process, ten-week STEM activities were conducted to the students. After STEM activities, individual interviews were held with students and student views on STEM disciplines and STEM education were revealed. Observation forms and STEM activity booklet as documents were used during the STEM activities to support the interview data. Data that was collected was analyzed through content analysis. In this study, it was seen that gifted and talented students STEM disciplines separately from each other and independently from real-life situation, however after STEM education, they were able to make interdisciplinary associations and associate them with other disciplines and real life. In line with the findings, it was concluded that STEM education is effective in defining STEM disciplines and in providing interest and motivation for STEM disciplines.

Keywords: integrated STEM education, gifted and talented students, STEM activities

Üstün Zekalı ve Yetenekli Öğrencilerin Mühendislik Tasarımı Odaklı Bütünleşik STEM Hakkındaki Görüşleri

ÖZ

Bu araştırmada, üstün zekâlı ve yetenekli öğrencilerin mühendislik tasarımı odaklı bütünleşik STEM etkinliklerinde STEM disiplinlerine ve STEM eğitimine yönelik görüşlerinin ortaya konulması amaçlanmıştır. Araştırma, nitel araştırma desenlerinden durum çalışması olarak modellenmiştir. Çalışmaya Yozgat Bilim ve Sanat Merkezi'nde destek eğitimi alan yedi 7. sınıf öğrencisi katılmıştır. STEM eğitimi öncesi öğrencilerin STEM disiplinlerine ilişkin görüş ve tanımlamalarını ortaya çıkarmak amacıyla bireysel görüşmeler gerçekleştirilmiştir. Çalışma kapsamında öğrencilerle on haftalık STEM etkinlikleri gerçekleştirilmiştir. STEM eğitimi sonrasında da öğrencilerle bireysel görüşmeler gerçekleştirilerek STEM disiplinlerine ve STEM eğitimine yönelik öğrenci görüşleri ortaya konulmuştur. Görüşme verilerini desteklemek için STEM etkinlikleri süresince dokümanlar (gözlem formu, STEM etkinlik kitapçığı ve fotoğraflar) kullanılmıştır. Elde edilen veriler içerik analizi yolu ile analiz edilmiştir. STEM eğitimi öncesi öğrencilerin STEM disiplinlerini birbirlerinden ayrı ve gerçek yaşamdan bağımsız olarak tanımladıkları görülürken STEM eğitimi sonrasında her disiplini birbirleriyle, farklı disiplinlerle ve gerçek yaşamla ilişkilendirerek tanımladıkları görülmektedir. Elde edilen bulgular doğrultusunda STEM eğitiminin, STEM disiplinlerini tanımlamada ve STEM disiplinlerine yönelik ilgi ve motivasyon sağlamada etkili olduğu sonucuna ulaşılmıştır.

Anahtar kelimeler: bütünleşik STEM eğitimi, üstün zekalı ve yetenekli öğrenciler, STEM etkinlikleri

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1 | INTRODUCTION

While schools generally focus on improving the academic performance of underachieving students, insufficient attention has been paid to the education of gifted and talented students, who will become effective at many jobs in the future (Thomas, 2018). Gifted and talented students require differentiated educational programs that are calibrated to their pace of development (National Mathematics Advisory Panel, 2008). Toward this purpose, the use of enriched curriculum content and materials is recommended in the education of gifted and talented students (Corrigan et al., 2013; Ericsson, 2014; Miedijensky & Tal, 2016). In most studies that have focused on gifted and talented students STEM education is recommended as it creates a learning environment that is effective in meeting the needs of these students (Andersen, 2014; Choi, 2014; Robinson et al., 2014; Schroth & Helfer, 2017; Tofel-Grehl & Callahan, 2017; Trna & Trnova, 2015; von Károlyi, 2013; Yoon & Mann, 2017). STEM education is a proper education model for gifted and talented students, which, by instilling interest and curiosity, provides them with the opportunity to develop solutions to complicated problems and make discoveries (Lee et al., 2013). Through STEM education, gifted and talented students are given the opportunity to collaborate in interdisciplinary studies and deal with difficult tasks through challenge-based learning (Song et al., 2010). By employing STEM education, which is carried out with gifted and talented students, it is now possible for creative individuals, equipped with required skills for STEM-related career fields, particularly science and mathematics, to be introduced to society (Adams et al., 2008). Accordingly, the significance of including STEM activities in the education of gifted and talented students has become evident. During the course of this study, engineering, design-oriented activities have been carried out while students' opinions on both STEM disciplines (science, technology, engineering, and mathematics) and the effectiveness of STEM education have been introduced before and after this education.

THEORETICAL FRAMEWORK

STEM is an acronym used to refer four different fields, i.e., science, technology, engineering, and mathematics, or some combination of the fields. When searched for integration in education, the concept of STEM emerges as the integration of science, technology, engineering, and mathematics disciplines. Bybee (2010) states that the aim of STEM education is to "develop in-depth understanding of STEM fields and to achieve development in technology" (p.30). It is stated that STEM education, which is an interdisciplinary integrated education, is effective for the learners to receive more qualified and rich content (Bryan et al., Mahoney, 2010; Honey et al., 2014). Integrated STEM provides learning opportunities in the connection of academic knowledge of basic sciences such as physics, chemistry, biology, and mathematics with technology and engineering applications. In this way, it is possible to use the knowledge acquired through activity beyond the memorization of mere knowledge. Integrated STEM refers to the integration of at least one STEM discipline with specific knowledge and skills of a discipline based on the interests of students (Corlu et al., 2014). While performing interdisciplinary practices, special knowledge and skills of each discipline are included (Callı, 2017). The integrated STEM education enables the use of knowledge and skills in basic sciences through activities. It is seen that although students are taught what information they need to know and what this information does, students cannot use these knowledge and skills effectively when they encounter with the applications. In this direction, it is important that students use their academic knowledge through activities.

Engineering design-oriented STEM concept emerges in the use of students' academic knowledge related to mathematics and science through activities. Engineering design is defined as providing solutions to complex and semi-structured real-life problems (Callı, 2017). In engineering design, the solution of complex problems involves a systematic way that use technology with science and mathematics concepts. Since engineering design involves social and realistic problems, providing students interest and motivation is also effective to develop an in-depth understanding of science, mathematics, and technology (Morgan et al., 2013). In addition to academic knowledge, skill usage and skill development gain importance in engineering design-oriented STEM activities. Engineering design-oriented integrated STEM is introduced to us through different implementation methods involving intramural and extramural learning strategies (pull-out/pull-in strategies) in the education of gifted and talented individuals. The regular curriculum that is implemented in schools may lead to limitations in terms of improving students' high-level skills in science and mathematics (Adams et al., 2008). According to The National Research Center on Gifted and Talented (NRC/GT), the majority of the schools where education programs designed for

gifted and talented students are carried out, and the teachers that work in these schools, do not comply with the required criteria in terms of the education of these students (Archambault et al., 1993). Subotnik et al. (2007) have stated that STEM education is the form of education that can be implemented in the pull-out activities for gifted and talented students. Pull-out STEM education is introduced as an education strategy that includes enrichment and differentiation strategies, intending to satisfy the needs of gifted and talented students.

Looking at the existing studies that have been conducted regarding the gifted and talented students, it has been stated that STEM education had a positive influence on students' success (Choi, 2014; Olszewski-Kubilius, 2009; Tofel-Grehl & Callahan, 2017; Trna & Trnova, 2015), skills (Andersen, 2014; Lubinski, 2010; Robinson et al., 2014; Schroth & Helfer, 2017; von Károlyi, 2013; Yoon & Mann, 2017), and career choices in STEM fields (Coleman, 2016; Jen & Moon, 2015; Steenbergen-Hu & Olszewski-Kubilius, 2017; Rinn, et al., 2008; Stoeger et al., 2017; Wegner et al., 2014). Accordingly, the significance of implementing STEM activities when designing the learning content for gifted and talented individuals became evident.

RESEARCH QUESTION

In this study, the following research questions were proposed by carrying out engineering, design-oriented integrated pull-out STEM activities with gifted and talented individuals:

1. What are the opinions of gifted and talented students concerning STEM disciplines before and after STEM education was performed?
2. What are the opinions of gifted and talented students concerning the conducted STEM education techniques?

2 | METHOD

Within the course of this study, engineering, design-oriented, integrated pull-out STEM activities have been conducted with gifted and talented students, and, during the same process, the aim was to identify the specification of student opinions regarding STEM and STEM education. Toward this purpose, the study has been modeled as a case study, one of the qualitative research designs. Using a case study approach enables a researcher to closely examine specific situations (person, program, process, etc.) within specific contexts (Merriam, 2001).

PARTICIPANTS

The participants in the study consisted of seven 7th grade students who had been identified as gifted and talented by the Guidance and Counseling Research Center (GCRC). Students in Turkey who are diagnosed as gifted and talented by the GCRCs of district directorates of the Ministry of National Education of Turkey receive out-of-school support education at SACs. Upon getting the required permissions, 7 gifted students all of whom volunteered for the STEM course, participated in the study. In terms of protecting the privacy of participants' information, the students names were coded as S1, S2,…,S7.

THE IMPLEMENTATION OF THE PROCESS

The research was conducted in two stages: A pilot study and a main study. In the first stage, the research team carried out the pilot study in order to address the deficiencies in the data collection tools and the content of STEM education. After the pilot study process was completed, the relevant arrangements were made regarding the STEM activity content, implementation, and data collection tools. The research team conducted the main study during the fall term of the 2017-2018 academic year.

Table 1. Course Content

Activity		Implementations
STEM artifacts activities	Bridge (4 hour)	Presentation about the bridges Creating discussion environment on bridge properties Problem status as "weight-resistant bridge model" Designing bridge models Constructing and testing models
	Windmill (4-5 hour)	Discussion of air pollution renewable energy sources Reading the "Don Quixote and the Windmills" then discussion physical properties of the windmills Problem status as "You have been asked to design a windmill to reduce pollution from energy sources. Create a working windmill for this purpose" Designing windmill models Constructing and testing models
	Catapult (4 hour)	Presentation about the catapult in history Watching animated movie about catapult shooting Problem status as "ejection catapult" Designing catapult models Constructing and testing models in "The farthest throw race"
	Kite (4-5 hour)	Creating a discussion environment for what purposes kites can be used Presentation of kites from past to present Watching animated movies about flying and discussing the physical properties of the kite Problem status as "flying a kite" Designing kite models Constructing and testing models
STEM activity with LEGO Mindstorms Kits	Rubik Cube's Solver Robot (6 hour)	Creating discussion environment on developing robot technology Trying to solve Rubik's cube Problem status as "Can we make a robot that makes our job easier?" Creating a robot by following the instructions Discussing the advantages and disadvantages of developing technology
3D STEM activity	My Logo (4 hour)	Introducing 3D printer technology Introducing Tinkercad program Modeling for logos in Tinkercad Printing models from a 3D printer Evaluation of the students' products
	Fractal (3 hour)	Investigation of fractal models in nature Modeling for fractal models in Tinkercad Printing models from a 3D printer Evaluation of the students' products
	Cell Model (3 hour)	Revealing preliminary information about the cell Cell observation with microscope Modeling for cell models in Tinkercad Printing models from a 3D printer Evaluation of the students' products
	Balance Model (4 hour)	Playing interactive game about balance and investigating the working principle of scales or seesaw tools Modeling for balance models in Tinkercad Printing models from a 3D printer Evaluation of the students' products

STEM activities, a variety of manipulatives (written and oral presentations, simulations, concrete, and abstract models) and technological tools (computer, 3D printer, simulation, Tinkercad 3D Modeling Program) were used during the implementation process. Through this approach, the study aimed to maintain the effectiveness of STEM activities via an enrichment of the activity content. During the implementation of STEM activities, the students generated solutions for engineering-based problems. The implementation process regarding the STEM activities is illustrated in Figure 1.

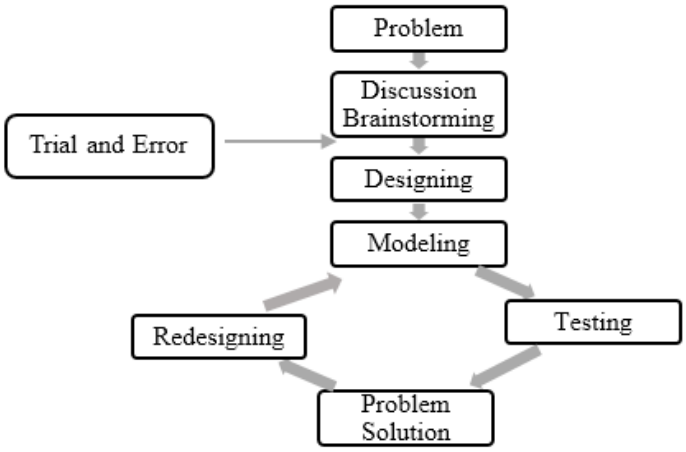

Figure 1. *Implementation Steps of STEM Activities*

STEM activities include three stages: Introduction, implementation, and evaluation. In the first stage, the problem is identified, defined, and discussed. Implementation follows and is a process that includes the designing and modeling stages. The third step involves testing the model, with solutions to the problem discussed and the product remodeled if necessary. Before STEM education, individual interviews were carried out with the students in order to identify the students' opinions on STEM disciplines, and this was followed by the engineering-oriented, three-month-long STEM activities. In this process, sample images of STEM activities performed with students are presented in figure 1. Sample images from the learning environment of this process are presented in Figure 2. After the STEM education process had also been completed, the opinions of the students regarding STEM disciplines and the implemented STEM education were revealed.

Figure 2. *The Learning Environment for The STEM Activities*

DATA COLLECTION

The study aimed to identify the opinions of the students on both STEM disciplines and implemented STEM education before and after STEM education. For this reason, the main source of data was the individual interviews. Alongside the individual interviews, the researcher observation form, STEM activity leaflet, and photographs were used as documents (observation form, STEM activity booklet, and photographs) for data support. By using a variety of data sources, data loss was prevented, while the comparison and confirmation of data were ensured.

Individual interview: The researcher conducted individual interviews with the participants both before and after STEM education. The contents of individual interviews were assessed, aiming to reveal the opinions of each participant on STEM disciplines and activities. The aim was to determine both the effectiveness of the implementation and the students' changing opinions through pre-STEM and post-STEM individual interviews. The individual interviews were one-to-one interviews between the researcher and the participant, and they were

carried out in the silent atmosphere of the SAC counseling office, where the participants would feel comfortable and safe. The individual interviews lasted for 15-20 minutes. Before the interview, each participant was informed that both the contents of the interview and the participant's name would be kept confidential, and that this information would not be shared with third parties. The participants were also informed about the objective of the interviews by the researcher. During this process, the participants were not given any information about the questions, subject, or scope of the interviews. During the course of conducting the interviews, a recorder was used for the researcher to record the interviews and prevent the loss of data, while also helping to keep the interview content in written form. Looking at the results of the literature review, a draft form containing six questions was prepared by the researcher. In order to determine the suitability of the draft form regarding the personal characteristics of the gifted individuals and their levels, as well as to define its suitability to the scope of the planned objective, the researcher gained the permission of the three researchers who are experts in science and math education and the education of gifted and talented individuals to act as consultants. The experts, who volunteered to help, were given detailed information regarding the content, subject, scope, and objectives of the study, and the individual interview form was reorganized according to the written feedback of the experts. Interviews with two 6th and 7th grade students at SAC were carried out to test the suitability of the prepared form for the students. Together with these interviews, the individual interview form was also made ready for use in the pilot study. After the pilot study, the individual interview form (IF) was put into its final form, along with the pre-STEM interview form (PSIF), which contained six questions and nine sub-questions, and the post-STEM interview form (POSIF), which contained six questions and 23 sub-questions. The IF was composed of the questions that included the definition of science, technology, engineering, and mathematics as STEM components, as well as the evaluation of STEM education and the researcher. (Appendix-1)

Observation: In this study, the observation form (Appendix-2) was used to support the data obtained from the individual interviews. After the draft observation form, which included skills and sub-skills, was prepared, it was then sent to the professional educators for consultancy to determine its suitability regarding the content of the study. With this purpose, it was put into its final form by consulting the two expert researchers in mathematics and science education. During the course of the study, the non-participant observer attended the activity setting. For each student, the semi-structured observation form was used in each activity to enable the researcher to make the observation. The observation form was prepared to define the skills of the students, as well as their views and behaviors toward the studies.

Documents: The written documents in the study included the STEM activity booklet, which was prepared by the students, and the photographs of the learning environment. The STEM activity booklet (Appendix-3) included sections where the students took notes during STEM activities and designed a model, as well as parts that contain their questions before and after the activities. The STEM activity booklet was prepared as a draft, and the two educators who are experts in STEM education were consulted. As a result of this consultancy process, the activity booklet was put into its final form by context editing according to STEM activities in the study. The students' written opinions, which they put down in the booklet, helped the researcher to acquire data concerning the presentation of the targeted opinions and skills within the scope of the study. In addition, the STEM activity booklet also included a student journal, where the students could express their feelings and opinions after the activity. This inclusion of this journal aimed to identify students' opinions on STEM activities and course.

DATA ANALYSIS

For the identification of student opinions on STEM education, the individual interviews, observation forms, and the documents were used. Data that was collected in these ways was analyzed through content analysis, which was supported by the photographs of the teaching environment, the observer notes provided from the observation form, and the direct quotations of the student responses in the individual interviews.

Student opinions provided from the individual interviews were grouped as pre-SC and post-SC. The voice recordings provided from the expressions and talks in the pre-SC and post-SC were converted into a written computer document. Coding was conducted in Nvivo 9. The codings related to students in the pre-STEM interviews were made in collaboration with the researcher who is an expert in mathematics education. The codings related to the other students were analyzed individually. The codes and the categories were compared and discussed. As a result of the efforts to reach a consensus regarding all the codings, the codes and the categories

were created. The student opinions were categorized according to whether they were opinions on STEM activities and STEM disciplines pre-SC and post-SC.

Observation data was provided by the researcher and the non-participant observer. By coming together, the observation forms of the researcher and the non-participant observer were evaluated and coded. The created codes were classified under the STEM disciplines as themes. The documents, including the STEM activity booklet and the photographs of the learning environment, were analyzed and evaluated within the scope of STEM education. The student opinions expressed in the STEM activity booklets were individually coded by an educator who is an expert in mathematics education. The result of the interview was left to a concordance between the researcher and the expert educator regarding the analysis of the observations and the documents.

The concordance coefficient between the researcher and the expert educator was calculated using the formula of reliability formed by Miles and Huberman (1994) (Reliability = (agreement/agreement+disagreement) x 100). The same coding and classification, made by both the researcher and the expert educator, was accepted as consensus, whereas the different codings and classifications made by each were accepted as disagreements. In line with this, the concordance between the researchers was calculated to be 0.78. As values of reliability over 0.70 are accepted reliable (Miles & Huberman, 1994), the results of the research were accepted as reliable.

RESEARCH ETHICS

Hacettepe University's ethical committee were approved the data collection procedures and the study was recruited by following the ethical standards.

3 | FINDINGS

The findings were presented as two themes after analyzing the qualitative data. These themes are STEM disciplines and STEM education.

OPINIONS ON STEM DISCIPLINES

Individual interviews with the students both before and after STEM activities regarding their opinions on STEM disciplines, as well as the data obtained from these interviews, are presented below under the headings of science, technology, engineering, and mathematics.

STUDENT OPINIONS ON SCIENCE PRE-SC/POST-SC

Pre-SC, students considered the concept of science as a subject that was entirely independent of mathematics, technology, and engineering. In their explanations, the students were inclined to associate the concept of science with the physics, chemistry, and biology lessons they received in high school.

S1: To me, science is biology, chemistry, and that sort of subjects.

S3: Now, we have science classes. Later on, this will branch into three subjects like physics, chemistry, and biology.

S4: Physics, chemistry, biology. These are science.

S1, S2 and S7 of the students also defined the concept of science as the world of living beings. Besides, S5 and S6 defined of science as discovery, invention, and experimentation.

S1: More like the science telling about nature. I mean science which is about natural things.

S2: For example, studying the human body, plants, animals...

S7: Plants, nature, animals are science. Studying living beings in nature, the human body, and the organs.

S5: Science means fun science experiments, discoveries, inventions. It means to discover, to examine.

S6: Speaking of science reminds me of the laboratory. Scientists study like that. Test tubes, explosions.

In line with these opinions, it can be said that students' definitions of physical sciences were limited. It is considered a reason for this to be the fact that the links between science and other disciplines are not maintained, and that the introduction of science in education environments is mainly done in the form of academic knowledge. Looking at the students' opinions toward science post-SC, it was observed that these students still associated science with physics, chemistry, and biology in the same way as had done pre-SC.

S2: It has branches like physics, chemistry, biology...

S3: Science is divided into three branches: physics, chemistry, and biology. The human body or animal body, such structures are related to biology. For example, the laws of nature, laws like centrifugence force are related to physics. Properties of matter, what components and molecules it is made up of, these are about chemistry and the most general is science.

S5: Science, for example, is something like the whole of the subjects of balance and physics.

It is seen that a great majority of the students defined science in terms of daily life and the reflections of science in real life. The students' definitions about science are presented below.

S1: In short, everything is included in science. Even cooking.

S2: I think it's life itself.

S4: To me, science is life, everything that defines life. It may tell us about what's happening in our bodies. It can tell us about animals, reproduction. Electricity, water. I think everything is related to science.

S6: I think all of the phenomena and the reasoning in life are related to science. For example, the building blocks of everything in life are atoms, the formation of everything in the world, the balance of the world, the balance of the universe, these are all about science.

S7: Most of our lives are already science. The systems in our body, our cells, then microbes or so, things we cannot see.

Looking at the students' definitions of science, it was observed that the students' definitions included a variety of disciplines and associations with real life. At the same time, it can also be said that while making definitions of science, the students effectively expressed themselves by generalizing and justifications. The students made their definitions of STEM disciplines by using sampling. This situation was considered to be based on the fact that science was involved in the study in a STEM-based and applied form, rather than as a separate discipline. By getting students to make associations through discussions and activities, the students internalized the idea that science, far from being an independent discipline, is instead heavily linked with real life.

STUDENT OPINIONS ON TECHNOLOGY PRE-SC/POST-SC

Pre-SC, looking at the students' opinions regarding technology and technological tools, it was observed that the students visualized power-operated electrical gadgets in their minds.

S1: Smartboard, computer, tablets, and flying cars are technology.

S2: Electronic instruments for example, stopwatch, microscope, smart boards.

S3: Things that can be developed. For example, table. Invented before, then developed, made extending. They are technology tools.

S4: Electrical gadgets are technology. Mobile phone, the camera, the recorder.

S5: Things people use in our age; telephone, computer, television, new things, I think. The new things we use, I think old things cannot be technology.

S6: Technologic tools are developed in technology. Smartboard, computer, mobile phone.

S7: Cables come into my mind. Things that work with electricity. Advanced machinery is in technology, I think.

Looking at this student's explanation regarding technology, it was observed that students made the definition by mentioning development and change instead of the limited understanding of technology that associates it only

with electrical gadgets. The fact that the students made their definitions of technology by giving examples of technological devices may result from their interactions with certain technological devices either inside or outside school environments.

Post-SC looking at the students' opinions on technology was defined as the tools that meet human needs. Also, S1 and S2 defined of technology as development. The students' explanations are presented below.

S2: ...emerges because of needs.

S3: ...anything that becomes handy for people.

S5: Technology is help for all human beings, you know the thing that comes handy for people, makes life easy. Objects, products.

S6: Technology I think every kind of invented gadget that makes human life easy.

S7: Technology is something that makes our life easy. Tools, objects these develop with our needs.

S1: Technology, I mean when you develop something new from something that already exists, it becomes a technological tool.

S2: I think everything that can develop is in technology. I mean when something develops, it develops according to the needs, if it didn't develop, that wouldn't happen.

It was discovered that the students made comprehensive explanations regarding their definitions of technology as an engineering study involving the changes and developments in the activity of meeting human needs. In line with this, it was considered that STEM course was effective in students' overall, deepening justifications of their opinions regarding technology and technological tools. In STEM activities, the development and evolution of technological tools were mentioned, and discussion environments were presented under this subject. In addition to this, Robotics design, Tinkercad program, the use of a computer, the Internet, and the 3D printer were included in the activities. It is due to the students' interactions with the media and IT technologies that their literacy skills in the digital era were effective in this situation. During the interviews that were carried out post-SC, there were similar student opinions on technology as only constituting gadgets that work with electricity. With regard to this, a dialogue between S4 and the researcher (R) went as follows:

S4: To me, technology is everything that works with electricity. Things that are not electronic don't sound like technology to me. I mean they are only objects, but electrical things are electronic tools.

R: Does it have to work with electricity?

S4: We talked in our lessons, for example, we said "the Internet" or watched a video during the kite activity. People used to learn about the weather conditions by kites. As technology advanced, meteorology aircraft appeared. These are what I understand. But with the word technology, electrical tools come into my mind.

Looking at this student's views, it was observed that while he understood that technology was used in a range of activities, S4 was not able to get away from his/her perceived image of technology. It was viewed that, despite being aware himself/herself that he was mentioning the development of the Internet or technology, the student identified the term technology as working with electricity, which resulted from his/her internalization of the concept. It was observed that the opinions of the students, with the exception of S4, changed after the study.

STUDENT OPINIONS ON ENGINEERING PRE-SC/POST-SC

It was observed that pre-SC, the students perceived engineering only as a career, which was a limited perception. Engineering was associated with career sub-fields, civil engineering, electrical electronics engineering, and mechatronics engineering. Examples of students' explanations about engineering are presented below.

S1: Different shapes of buildings. Decorating.

S3: Mechatronic engineering, mechanical engineering, or so.

S5: Engineers come to my mind. Person working in the factory.

S6: People working in the construction, the building comes to my mind. Workers are engineers.

S7: Like civil engineering, mechanical engineering. The fields of engineering as careers come to my mind. University comes to mind.

Looking into the students' opinions, engineering was defined as a professional field. In addition, engineering was also illustrated as constructing buildings and houses. Students were considered to have made these definitions based on their daily experiences. It can be said that the students' lack of experience in engineering in both their in-class and out-of-school education might have influenced their definitions of engineering. Other than these opinions, it was also recorded that S3 and S4 explained engineering as producing ideas and maintaining development.

S3: Investing in the future comes to my mind. I think engineering can be developed and it has a lot of fields. It can be worked on a lot. Engineers can produce plans, projects. You know it doesn't have to be concrete. For example, we make projects at SAC, too.

S4: Developing ideas that don't belong to the future is engineering. It can be experiments, we discover new substances there, too… We work in TUBITAK projects as engineers, too, after all, we produce new things.

It was observed that S3 and S4 made more comprehensive explanations on the concept of engineering. This situation was considered to result from the students' characteristics, experiences, and inclinations. The students approached their activities, plans, projects, and ideas in SAC and TUBITAK (The Scientific and Technological Research Council of Turkey) projects from the angle of engineering. Accordingly, students' experiences enabled them to make more comprehensive definitions regarding engineering. Looking at the student views post-SC, it was observed that engineering was not only defined as a career by the students, as some students defined engineering as relating to designing and design.

S1: The word engineering reminds me of architecture. Designing and putting the design into activity and things.

S2: Designing some original things and putting them into activity. For example, if we only designed by Tinkercad and didn't put it into activity and see how it works, I don't know, it wouldn't be complete. For example, if we only designed by Tinkercad and didn't put it into activity and see how it works, I don't know, it wouldn't be complete. I mean, it's much better to see how it works in real life.

S3: Engineering is designing some things by bringing branches of science together. It doesn't mean you have to be an engineer to do this. For example, we are not engineers but designed, too.

S7: When you speak of engineering, it reminds me of designer, designing.

S7 defined engineering as both innovation and designing as "development, innovation, this is what comes to my mind." Alongside these opinions, some students also expressed their views on the aspects of originality and creativity of the product produced as a result of engineering.

S2: Engineering means originality.

S4: Engineering is owning our design, originality. I mean one says it must be unique, a thought like it must belong to me.

S5: Engineering is something that happens with the help of our own imagination, something we created ourselves.

S6: Making new things, designing, imagination, originality, all of these are engineering.

Post-SC, it was observed that students defined engineering as the original model design or creating a product. In addition, expressions regarding product development, and innovation were also used in their definitions of engineering. It was observed that the students' definitions for engineering changed in this way due to the design and product development activities in STEM activities. Looking at the student opinions pre-SC, students made limited definitions of engineering, where it was defined as a career only done by engineers. It was revealed that these perceptions and thoughts changed through the engineering-oriented activities, broadening students' definitions of engineering.

STUDENT OPINIONS ON MATHEMATICS PRE-SC/POST-SC

Pre-SC, it was observed that the students defined mathematics as numbers and the four basic mathematical operations. The students' definitions of mathematics are presented below.

S1: Addition/subtraction and multiplication/division are all mathematics.

S4: Doing operations is mathematics.

S6: Doing operations with numbers, like addition/subtraction. Equations.

S7: Numbers, operations, equations...

S2 associated mathematics with geometry, depending on basic geometric forms as "speaking of mathematics, geometry comes to my mind. Geometric forms, triangles, rectangles, squares or so". The reason for the students' perception of mathematics as a science and a lesson that includes only numbers and operations was considered to be because of the presentation of mathematics in education as only relating to theoretical academic knowledge, rather than activity. Thus, it can be said that the students failed to realize the scope of mathematics' implementation and its links with both the other disciplines and real life. Students' definitions of mathematics also included expressions that they perceived mathematics as a lesson that creates a negative attitude. S5 made the following explanation: "The lesson that I'm scared of the most and the lesson I fail comes to my mind. Because it's boring, we are always doing operations. You know I'm scared because I can't do it". S5 statement about mathematics includes the expression "the lesson I'm scared of the most". Looking at the dialogue the student, it was seen that the content of the mathematics lessons including only numbers and operations, and therefore a lack of practical implementation, would lead the students to develop negative emotions. Apart from the attitude that considers mathematics only as a lesson, it was observed that mathematics was also associated with real life by S3 as "Life without mathematics can't be imagined. For example, we go to the grocery store, addition/subtraction is everywhere. This is the simplest example".

Post-SC, it was observed that the students made associations about mathematics within its merit. The sample definition for this by S1 and S5 was as follows: "for example, shapes, ratio, proportion, fractions, there is everything. You know, then, rational numbers", "A digital science. There are numbers, operations". In addition to the students' associations of mathematics within its merit, it was seen that they also associated it with real life.

S1: Mathematics is our life itself; you know there is mathematics in everything...in making a cake, I mean there is mathematics in every part of our life.

S3: Mathematics, according to the Pythagoras theorem, everything in the universe is made up of mathematics. Everything we see in nature has a golden ratio and this is related to mathematics.

S4: Mathematics, too, is in all parts of our lives in fact. I mean letters, numbers are in every part.

S5: It's a digital science but we don't only use it in our lessons, we also use it in our daily errands a lot. Besides, we have to know mathematics to do other things.

Students such as S2, S6 and S7 included problem-solving and multiple thinking skills in their definitions of mathematics.

S2: I think it's difficult for people but it's very simple when you grasp its logic, and it has logic. In mathematics you think, you understand what you read. It helps with multiple thinking (Figure 3).

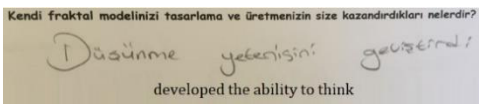

Figure 3. *S2's Quoted Part in STEM Activity Booklet*

S6: Mathematics is logical practice to find solutions to all the problems in the world.

S7: Mathematics is the lesson that we are learning to solve the problems in our lives. I mean we are learning the problems in our lives here, for example, equations or so. We are learning many things that we see in our lives.

Post-SC, students' opinions on mathematics evolved to also include logical thinking, problem-solving, and multiple thinking, rather than just numbers and operations. The students expressed that mathematics offers the solution to problems in real life and areas of science that exists in every field of life. It can be said that STEM course was effective in terms of these changing student opinions toward mathematics. It was considered that, together with STEM course, the associative presentation of mathematics with real-life and other disciplines, as well as its applied form in the activities, changed students' opinions in this direction. Upon evaluation of the student opinions, the results in Table 3 were reached.

Table 3. Student Opinions on STEM Disciplines Pre-SC/Post-SC

Pre-SC	Post-SC
Each discipline was defined independently from each other.	STEM disciplines were defined with their interdisciplinary relations, their links with other disciplines, and real life.
Science was defined as a teaching subject at schools, and as a lesson that includes physics, chemistry, and biology.	Science, as well as including various disciplines and their sub-disciplines, was defined as real-life itself.
Mathematics was seen as the branch that includes numbers and operations.	It was mentioned that mathematics exists in all disciplines and all parts of life, and that apart from numbers, it also involves the processes of problem-solving and multiple thinking.
The relationship between science and mathematics was expressed, with mathematics consisting of the digital operations in science lessons.	Science and mathematics, being connected with most disciplines, were defined in terms of their existence in all parts of life.
Technology was exemplified by electrical and electronic tools.	Technology was defined as the development and changes that occur according to human needs.
Engineering was defined as the profession of engineers.	Engineering was described as product creation through the use individual design, originality, and innovation.

STATEMENTS OF PUBLICATION ETHICS

It was observed in S1, S2 and S7's opinions that the STEM activities enabled students to make interdisciplinary associations during the operation of such activities post-SC.

S1: First of all, it's all fun. We are learning to combine different fields. After that we are using these together.

S2: I think thinking boosted development, associating boosted correlation. In this way each part of the fields came together and made the whole, these make life, the universe.

S7: I saw that all of them are related to each other. We learn better when we practice it that contributed.

During the activities, STEM subject contents were presented to the students in a way that enabled them to make interdisciplinary associations. Toward this purpose, besides the science and mathematics content, technologic tools were used in the learning environment, while engineering-oriented contents were also carried out. In this process, student opinions were revealed, utilizing discussion environments, and the students were encouraged to exchange their ideas. Through this process, it was ensured that the students were able to integrate science (physics, chemistry, biology, astronomy, etc.), mathematics (geometry and arithmetic), technology (the use of technological tools, technological literacy, etc.), and engineering activities. The students' evaluations of STEM course showed that STEM activities made positive contributions to the development of their academic skills and technical abilities. Example students' statements and explanations in the STEM booklet (Figure 2) are presented below.

S3: This way by gathering all the fields of science together, I mean by doing science and mathematics together, there is no question mark left in my mind. With such activities, we were able to understand better and so become more successful in education.

S4: I've learned new information.

S5: I both enjoyed and learned a lot of things. I learned some science subjects. I improved a bit more in mathematics and technology. And besides, we discussed such subjects and so I got information.

S6: It teaches us new things, for example, we come to learn the things we don't know. Who found? Who made? Kind of new things I learned...

S4: I learned the use of a 3D printing program. My engineering improved; I think I can do more things...

S5: I liked using technological devices I can't because but here we used the computer, the 3D printer and did modeling, we used program. That's why I've got used to and I liked it a lot (Figure 4).

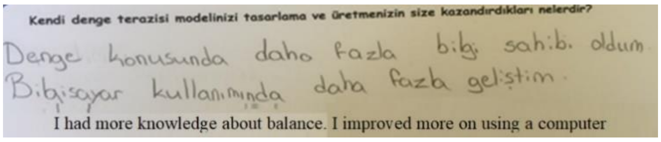

Figure 4. *S5's Note in STEM Activity Booklet*

In STEM activities, discussion environments on various subjects were created, with the students encouraged to express their opinions. In this way, the students were allowed to exchange their opinions and thoughts. At the same time, the students were also able to make use of their academic knowledge while creating products. It was observed that the students mentioned the improvement in their academic knowledge and skills during the STEM education process. STEM activities included robot designs with Lego sets, 3D modeling with Tinkercad, the use of 3D printers and computers, searching the Internet, and similar activities. In this way, the students' technical skills (engineering skills, the use of IT technologies) clearly improved, while they also gained experience in the use of new programs and tools. This was particularly noticeable in the case of a student who had difficulty in using the technology who mentioned that she had made progress in that subject. It was perceived that STEM activities supported the students' creativity and originality in their work, such as S2's explanations: "like this, designing something all over again and having its own originality. They take care of everybody individually for example in other group environments maybe they don't show this much care and materials are not enough but at the moment you can use as much as you want. This way I can do the thing I want in my mind". Similarly, it was observed that the creativity of the students was supported in the observation notes of the studies they carried out in the STEM process. Sample observation notes are presented in the Figure 5.

a) b)

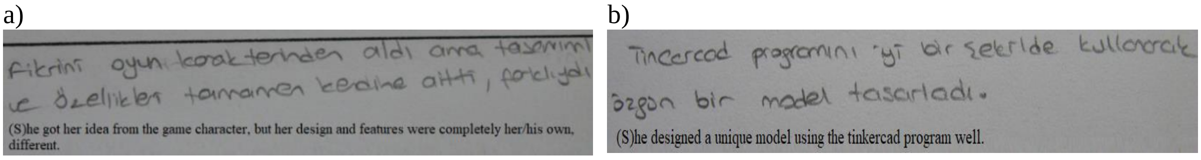

Figure 5. *The Observer's Note About a) S1 and b) S4*

Besides, S5 and S7's written expressions, who have opinions that the STEM activities process is fun, are given in Figure 6.

a) b)

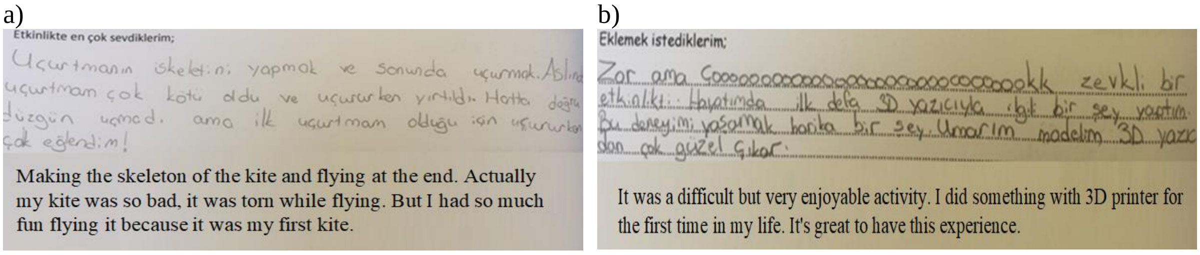

Figure 6. *a) S5 and b) S7's Note in STEM Activity Booklet*

In STEM activities, the students were planned their studies according to their wishes and were created their desired products. In this way, the students mentioned that they were effective in creating their original models, which revealed their creativity. The students thought that their engineering skills improved by modeling and performing their studies themselves. The students found the STEM activities to be interesting and motivating.

S3: School is boring but if these are put into activity, school becomes fun. Because it becomes fun, the number of successful students reaches the ceiling. Most students, although they're clever, do nothing because lessons are boring.

S4: In the subjects that don't interest me, I put my head on the desk instantly. There have been times I did this during the lesson. I mean when I get bored, I feel suffocated, and I put my head down. But four fields together attracted my attention.

S6: It was more understandable and more fun compared to the normal curriculum.

S5: At the beginning, I was scared I even asked you. "can I do it by drawing?" but later I liked it a lot. I saw I could do it. I wish we continued more.

S7: I couldn't do much for example I couldn't use a computer, or I didn't know a 3D software but now when I learn these like this, I always feel like doing it.

It was observed that the students found STEM activities interesting and fun. Students who got bored with the standard curriculum and teaching programs, and did not want to listen, were observed to find STEM activities interesting, generating eagerness in students to attend these activities. This situation is considered to be the result of interdisciplinary associations. It was noticed that STEM activities created interest and motivation in students, as these activities do not merely include academic knowledge and are instead implementation oriented. The students have positive opinions toward STEM careers, as the following opinions and written explanations in Figure 7 were demonstrate.

S4: I like doing activities and doing them myself. I was proud of myself when I saw what I could make. I show what I made to my friends saying "Look at what I've made."

S1: When we grow up in the future, we can focus on such designs more. We are learning to use the fields together and you know this will become handy when we grow up.

R: Would you like to work in such fields in the future?

S1: Yes, for example, the things we have learned here will contribute to me in those times. I will need to use technological tools for example, these can be more difficult things but now I've learned the easier form of it.

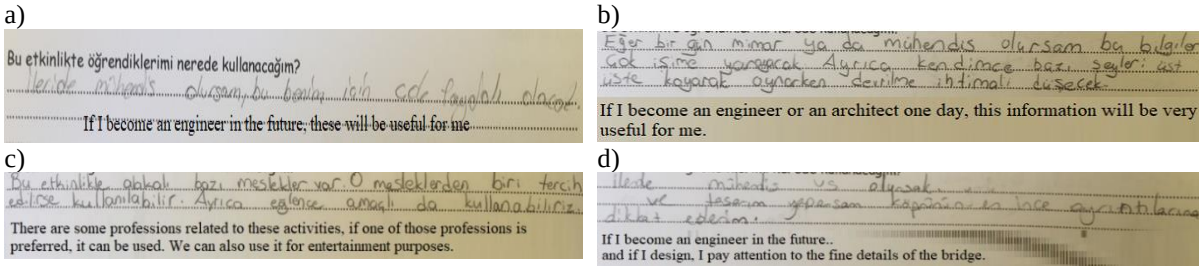

Figure 7. a) S3, b) S5, c) S6 and d) S7's Note in STEM Activity Booklet

Based on the individual student interviews and their opinions in the STEM activity booklet, it was observed that the students would benefit from their experiences in STEM activities in their future careers. Looking at the students' statements, such as "if I become an engineer in the future..., if I prefer a career, related with these fields...; if one day I become an architect or an engineer...." it was regarded that their thoughts about choosing a career in STEM-related fields had developed in their minds.

4 | DISCUSSION & CONCLUSION

In this study, it was seen that gifted and talented students STEM disciplines separately from each other and independently from real-life situation, however after STEM education, they were able to make interdisciplinary associations and associate them with other disciplines and real life.

It was concluded that STEM education and activities enhanced and changed the definition of STEM disciplines. The students' improved opinions on STEM disciplines were in accordance with STEM definitions in literature. In line with this, the students' limited and deficient understanding of STEM disciplines was deemed to have been improved through STEM activities, and this helped them to make correct definitions. According to the students' opinions, they had the opportunity to carry out their studies from an interdisciplinary perspective. It was recorded that while the students previous evaluated each discipline independently, following STEM education, they realized that all of the disciplines were interrelated. This result shows a similarity to the other STEM-oriented, association-based studies (Lou et al., 2011).

Prior to their STEM education, the students defined engineering as purely a profession that related to the people who did such work. By contrast, after STEM course, they developed a different understanding of engineering as a process that includes originality in designing and creating a product. It was considered that engineering-oriented and technology-based activities, such as 3D modeling, the use of 3D printers, and robotics, were effective in these positive changes in students' opinions (Sen et al., 2020). This result parallels the findings of other studies in the existing literature (Ayar, 2015; Blanchard et al., 2015; Eguchi, 2016; Kandlhofer & Steinbauer, 2016). Similarly, Blanchard et al. (2015) has stated that some students do not comprehend STEM fields, particularly engineering. Blanchard et al. (2015) recorded that the students' understanding of engineering, and their opinions regarding its place in the society, could be changed by solving real-life problems in an engineering-oriented and technology-based study. Alongside a two-week-summer school program, an engineering-oriented study with the students was conducted by Elam et al. (2012). This study concluded that the students' perceptions of engineering changed and that they developed a positive attitude. It was observed that the results of this study corresponded with the result of the other studies in the literature, with the students' academic knowledge and skills deemed influential in the product creation process regarding STEM activities.

The students' opinions also highlighted that the academic knowledge of science and mathematics were elicited better as a result of the process. Accordingly, it was concluded that academic knowledge and skills were improved through the STEM activities, and that this acquisition of academic knowledge was effective in STEM activities. This result was supported by other studies that have demonstrated the interaction between STEM education and academic knowledge. For example, the study by Cotabish et al. (2013), which aimed to determine the effect of STEM education on academic knowledge and skills, found that STEM education was effective in the enhancement of the content of science and mathematics. Similarly, Zuga (2004) and Brophy et al. (2008) have both stated that without the content knowledge of mathematics and science, cognitive processes would not be effective, showing that academic knowledge is significant in engineering-oriented activities. In line with this finding, it was concluded that content knowledge and activities ought to be internalized within one another.

In terms of the students' opinions on STEM activities, it was clear that they gained new experiences and acquired new skills. It was also concluded that the students who got bored in the ordinary teaching environment, as they are gifted and talented, became interested in the content of STEM activities, where they could be active themselves. Similarly, Stith (2017) has stated that by implementing STEM-oriented activities with gifted and talented students in school education, students are provided with the opportunities to conduct scientific research independently and, eventually, to work in their fields of interest professionally. It was concluded that the students that participated in STEM activities believed that they could make use of the experiences they gained during such activities in the future. Similarly, Brown and Lent (2013) have stated that students' interest and curiosity toward STEM activities are effective in generating goals relating to career fields that include such activities. Buxton (2001) mentions that an interest in science and mathematics would be effective in career preferences, including in these fields. With this aim, many studies (Dabney et al., 2012; Welch & Huffman, 2011) have stated in their studies that STEM activities would increase the students' interest in STEM disciplines and affect their career trends positively. The inclusion of interdisciplinary studies in STEM course was considered to be effective in improving the students' academic knowledge and skills. It was maintained that the applied use of the students' academic

knowledge, particularly their science and mathematics knowledge, provided them with the opportunity to learn more effectively. Furthermore, by employing STEM course, the students' academic and technical skills were enhanced. Rehmat (2015) states that participating students' use of the contents of the STEM disciplines through practical application developed a positive attitude. When insufficiently motivated, gifted and talented students did not attend the activities or enjoy the course environment and were indifferent to the activities.

The importance of gifted and talented students' interest and motivation was defined by Chapman (2011), who stated that such students are only interested in tasks that are beyond their abilities and start to activity them, enabling them to focus on and continue what they are working on. It was concluded that as a result of both the attendance and the enthusiasm of the participating students in the study, STEM activities were effective in attracting their attention and motivation. The result that STEM activities provide fun teaching content was furthermore supported by student opinions. This result presents parallelism with similar studies in the existing literature (Blanchard et al., 2015; Rehmat, 2015). These studies all mention that students were pleased to take part in STEM activities, and thus attended STEM activities.

In line with the outcomes obtained from the present study, the following suggestions might be made for future studies:

1. It was observed that STEM education has restored the motivation of the students that feel bored and lose interest due to the curriculum-bound activities and activities in this study. Accordingly, it is considered that curriculums and schedules can include application-based STEM education activities instead of presentation-based information transfer.
2. Owing to STEM education, the gifted and talented students that regarded each discipline as independent from each other and as a teaching subject at schools, then realized the fact that the disciplines are interrelated and connected with real life. STEM education maintains the associability of each discipline through the integration of students' academic knowledge with the scopes of application.
3. It was observed that the negative attitudes and fears of the gifted and talented female students were eliminated by their gain of experience in technology and the use of technology tools. It was considered that the engineering and innovation skills were effective in the placement of girls in the 21st-century career fields. It was reasoned that STEM education that includes information and communication technologies would enable girls to gain experience, improve positive attitude and STEM education will be effective in their career placement.

STATEMENTS OF PUBLICATION ETHICS

Hacettepe University Ethics Committee issued an ethics committee approval certificate with the decision no 815 on 13 April 2018 (35853172/433-1669).

RESEARCHERS' CONTRIBUTION RATE

Authors	Literature review	Method	Data Collection	Data Analysis	Results	Conclusion
Ceylan ŞEN	☒	☒	☒	☒	☒	☒
Zeynep Sonay AY	☒	☐	☐	☐	☒	☐

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CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

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Studying the Academic Procrastination Theme with Psychodrama: A Case Report

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ABSTRACT

In this study, a case report of the member who participated in the psychodrama experience group with the theme of academic procrastination with university students was presented and it was aimed to discuss the sharing and awareness of the case in the framework of the related literature on academic procrastination. The case is a 30-year-old male, married and living in Eskişehir with his family and is at the dissertation stage of his doctoral education. The psychodrama experience group was planned as 10 sessions of approximately two and a half hours a week and the intervention were carried out at Psychological Counseling and Guidance Center of Anadolu University in 2018-2019 Spring term. The sessions were aimed at increasing the awareness of the participants about themselves and gaining insight into their academic procrastination. The case joined the group in the second session and continued with the group until the end of the group process. In "seed planting" game held in the second session, the case has determined "achieving its professional goals" as its short-term goal and "reaching its ideals" as its long-term goal. During the psychodrama experience group process, it was observed that the case gained significant awareness about himself and his academic procrastination. In the light of the findings, it can be stated that the case made significant gains from this study and therefore psychodrama practice is an effective method for young adults to gain awareness about themselves and to gain insight about their academic procrastination.

Keywords: Psychodrama, young adulthood, academic procrastination.

Psikodramayla Akademik Erteleme Temasının Çalışılması: Bir Olgu Sunumu

ÖZ

Bu çalışmada üniversite öğrencileriyle gerçekleştirilen akademik erteleme temalı psikodrama yaşantı grubuna katılım gösteren üyenin olgu sunumu yapılmış ve olgunun süreç içerisindeki paylaşım ve farkındalıkları akademik ertelemenin ilgili alanyazını çerçevesinde tartışılması amaçlanmıştır. Olgu 30 yaşında, erkek, evli ve ailesiyle birlikte Eskişehir'de yaşamakta ve doktora eğitiminin tez aşamasındadır. Psikodrama yaşantı grubu haftada bir yaklaşık iki buçuk saatlik 10 oturum şeklinde planlanmış ve uygulama 2018-2019 Bahar döneminde Anadolu Üniversitesi Psikolojik Danışma ve Rehberlik Merkezi'nde gerçekleştirilmiştir. Oturumlarda üyelerin kendileriyle ilgili farkındalıklarının arttırılması ve akademik ertelemeleriyle ilgili içgörü kazanmaları amaçlanmıştır. Olgu, gruba ikinci oturumda katılmış ve grup süreci bitimine kadar gruba devam etmiştir. İkinci oturumda gerçekleştirilen tohum ekme oyununda olgu "mesleki olarak hedeflerini gerçekleştirebilme" yi kısa vadeli hedefi," ideallerine ulaşmayı" da uzun vadeli hedefi olarak belirlemiştir. Psikodrama yaşantı grubu sürecinde olgunun kendisiyle ve akademik ertelemeleriyle ilgili önemli farkındalıklar kazandığı görülmüştür. Bulgular ışığında olgunun bu çalışmadan anlamlı kazanımlar sağladığı ve dolayısıyla psikodrama uygulamasının genç yetişkinlerin kendileriyle ilgili farkındalık kazanımı ve akademik ertelemeleriyle ilgili içgörü edinebilmelerinde etkili bir yöntem olduğu ifade edilebilir.

Anahtar kelimeler: Anahtar Kelimeler. Psikodrama, genç yetişkinlik, akademik erteleme.

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1 | INTRODUCTION

Procrastination is defined as the delay of a planned task by an individual without intentional or rational reasons, regardless of the negative consequences (Neenan, 2008; Steel, 2007), or the unnecessary delay of things that are necessary to complete through action, and as a result, a tendency to complete the delayed task when one feels intense sadness (Solomon & Rothblum, 1984). In the relevant literature, procrastination is commonly classified into two distinct forms. Daily, habitual delay in starting or completing tasks in different aspects of life is defined as procrastination as a personality trait, while postponing only in a certain part of life is defined as situational procrastination (Ferrari et al., 2005). In addition, it has been suggested that academic procrastination is the most common type of situational procrastination (Senecal et al., 1997).

Academic procrastination, defined as students putting off studying for exams or completing weekly reading assignments, postponing the preparation of term papers until the last moment, missing deadlines for important projects, and delaying administrative duties related to academic life (such as returning library books or registering for an exam) (Rothblum et al., 1986; Solomon & Rothblum, 1984), leads to a variety of negative academic consequences (Balkıs, 2013; De Paola & Scoppa, 2014; Sharma & Kaur, 2011). Moreover, this problematic behavior causes mental health problems such as depression and anxiety (Eisenbeck et al., 2019; Stead et al., 2010; Tice & Baumeister, 1997).

Despite such negative effects in the academic field as well as mental life, this problematic behavior is common among university students (Burka & Yuen, 2008; Ulukaya & Bilge, 2014; Ferrari et al., 2009; Kachgal et al., 2001), which has led field researchers to investigate the motivations for such detrimental behavior. Studies conducted in this area have observed that the causes of procrastination vary (Çelik &Odacı, 2015; Rebetez et al., 2015), and that the patterns cannot be explained with a single variable. On the contrary, due to the inherent nature of procrastination, it can be more comprehensively explained through cognitive, affective and behavioral components (Çetin & Ceyhan, 2018; Uzun Özer, 2010; Uzun Özer et al., 2014). It is noteworthy that group interventions have been carried out to prevent or to cope with this phenomenon, and a variety therapeutic approaches have been employed in these studies (Çelik & Odacı, 2018; Gading, 2020; Glick & Orsillo, 2015; Puspita & Sugiharto, 2020; Toker & Avcı, 2015). One effective approach studied is psychodrama (Durmuş et al., 2021).

Psychodrama, which can be defined at its simplest as the rediscovery of reality through action, enables emotions to be expressed functionally—acting out—under control and verbal narration is replaced by action (Gençtan, 1976). Psychodrama is a process of self-discovery that enables individuals to realize their emotions, lifestyles, inner lives, conflicts, and motivations, and since the individual reaches this process while in action, Moreno (1946) termed it “action insight”. Action insight is the result of learning by action in a variety of forms. It is defined as a whole of emotional, cognitive, imaginative, behavioral, and interpersonal learning experiences (Kellermann, 2013).

The basic starting points in psychodrama are spontaneity, action, and creativity. Although "spontaneity" is defined as a positive reaction to new conditions or a new reaction to old conditions, the central idea is to isolate this skill and to identify it next to others in shaping and directing human life (Özbek & Leutz, 1987). It is also important to note that spontaneity is an ability that can be gained, and that it emerges warmly, considering that it functions only when it exists, and disappears but not loses its function after it fades away, like a light being turned off. (Altınay, 2015).

“Action” is said to have existed long before human beings and to be much older than speech. It is defined as a cosmic event and is identified as a sign of all types of vitality (Özbek & Leutz, 1987). Psychodrama, which is based on Moreno’s philosophy of being entirely distinctive and different, is essentially an action therapy. In this aspect, action in psychodrama paves the way for reality to be seen and solidified as it is, and at the same time enables any resistance to be resolved quickly (Altınay, 2015). When we think that there is no moment in our life without action, the structure of psychodrama creates opportunities for learning in action and change, is important in terms of allowing academic procrastination, an action often constructed with words and where cognitive explanations are frequently chosen, to be studied in a new and different way through the integrity of action.

The third basic concept in psychodrama philosophy is “Creativity”, described by Moreno as the living reality of the cosmos. It is stated that creativity appears wherever spontaneity and action are directed towards the aim and principle of shaping the existing (Özbek & Leutz, 1987). However, in Moreno's philosophy, creativity is unified with divinity and is described as the most fundamental purpose of human beings who are a part of nature that is God (Altınay, 2015). Considering these features, the most important role in the emergence of creativity in psychodrama belongs to spontaneity. As a catalyst in its relationship with creativity, spontaneity enables creative thoughts to come to life and be realized. In addition to spontaneity, action, and creativity, permanence is considered important in psychodrama and related to these three concepts. It is an indispensable concept connecting human generations to the past, increasing desire for the future, and positively affecting spontaneity and creativity, when past experiences, dreams, fantasies, and designs are given meaning in psychodrama. (Özbek & Leutz, 1987). This close relationship among the basic elements of psychodrama is important in understanding the function and structure of psychodrama and its power to make change real.

Psychodrama has quite important, corrective, and maturing effects in treating mental disorders and in handling and processing psychological issues within groups. It can highlight the importance of creativity by taking existential and phenomenological processes into account, emphasizing the importance of spontaneity and how it is developed, and enabling communication, feedback, and collective social change (Blatner, 2002). In light of all of this information, it can be stated that using psychodrama that treats action, spontaneity, creativity, and permanence in an interactive process can be effective providing help to individuals who have problems in academic procrastination, which presents a complex structure with its cognitive, affective, and behavioral dimensions (Çetin & Ceyhan, 2018; Uzun Özer, 2010; Uzun Özer et al., 2014).

In this study, a case report of participant in the psychodrama experience group related to academic procrastination in university students was presented and with the goal of discussing sharing and awareness of the issues in the framework of related literature on academic procrastination.

2 | METHOD

The model of this research is a case report structured in a qualitative design. Case report; is a detailed description of the problems experienced by a client for scientific or educational purposes (Riley et al., 2017). This research includes the case report of an individual who is seeking psychological help for academic procrastination and joins the psychodrama experience group.

DETAILS OF THE CASE

The case is a 30-year-old male, married and living in Eskişehir with his family. He is working as a research assistant at a public university and is at the dissertation stage of his doctoral education. He applied to the psychological counseling and guidance center to get individual support for his academic procrastination and decided to join the group after a pre-interview. The case began his own process with the second session of the group.

Considering differing demographics with the other members of the group, his awareness in the group process and his significant contributions to other members, it was deemed appropriate to choose this case.

PSYCHODRAMA INTERVENTION

The academic procrastination themed psychodrama experience group was applied in the Psychological Counseling and Guidance Center of Anadolu University in the spring term of the 2018-2019 Academic Year. During establishment of the group, announcement posters were placed and undergraduate and graduate students who sought support for academic procrastination made individual applications to the Psychological Counseling and Guidance Center of Anadolu University. Preliminary interviews lasting about half an hour were held with each applicant, accompanied by the group director and the assistant director. In these preliminary interviews, the nature of psychodrama was mentioned, information was given about the purpose of the group and the group process, and participant consent was obtained after declaring that data collected from the study could be used for research purposes and that the directors would be supervised throughout the study. After the application process

was completed, the group opened with 7 university students. In the second week, 3 new members were added to the group and the process was completed with 10 people; 3 men and 7 women.

Group sessions were planned to increase member awareness about themselves, to help them recognize intellectual, emotional, and behavioral patterns related to their academic procrastination by addressing past and current problems, and conflicts or expectations, anxieties, and difficulties for the future. An additional goal was to help them develop coping skills by improving spontaneity. The group work lasted 10 weeks between March and May 2019 with sessions were held once per week for approximately for two and a half hours. Each session consisted of a warm-up, individual or group games, and public sharing sections. Although the sessions were planned in line with the theme (academic procrastination) of the group, sessions were shaped according to the needs of the members that day. Since the students are individuals having difficulty with academic procrastination and seeking help, it can be said that the studies developed according to the current needs of the group did not stray from the theme.

The director and assistant director reached the advanced level training at Abdülkadir Özbek Psychodrama Institute, and through this study, realized the pilot implementation which is one of the requirements of the training. The assistant director joined the group circle during the group process, actively participated, and provided support, especially when the director needed it. The audio from each session was recorded and a report issued after the session. These reports were read by way of the "multiple mirror" method by the director of the psychodrama training group where the group director was attending, together with a different member from the training group, and regular supervision support was provided to the trainers every week. Additionally, group supervision support was also received from the psychodrama training group that met once a month. Members were also informed about this supervision process.

PSYCHODRAMA PROCESS

The first session: In this session, the aim was to introduce the members to each other, ensure the newly acquainted members continue the process as group members, and discuss the group rules, accompanied by psycho-dramatic games. The case was not present during this group process.

The second session: In this session, a "seed planting"[1] game was played to help the members realize their short and long-term goals. A blanket was laid in the middle of the group, representing fertile soil, and the members were encouraged to use objects and to plant seeds desired to grow in the short- and long-term on this fertile soil. Our case chose the "bicycle" to represent his seed that will grow in the short term and, the "candle holder" to represent long-term growth. He stated that the short-term seed represents professional goals. This symbol contained a more flexible, more dynamic, and more self-dependent meaning (spontaneity) and in this context, the more he pedals (the bicycle), the more likely this seed will grow. The seed for the long-term was his ideals and he chose the candle holder because they were stronger and more solid. For the rest of this session, the case picked the word "Ideal" as his nickname in the game "Journey to the Past", which was played to determine nicknames to be used in the study reporting. Considering the case's bicycle metaphor, which he explained as *"The faster I pedal, the quicker I proceed"*—especially in relation to professional goals, it can be stated that he joined the group with a concrete expectation, which could be related to his academic procrastination.

The "sculptor-clay" game was also played in this session. The case was the first to share his thoughts and said that he freely shaped the clay in the first part of the game but after a while, he had difficulty being creative because of the infinity of alternatives. In the second part of the game, he felt cramped when the clay moved against him and caused difficulties, however, over time, he turned the clay's moves against him into an opportunity and became more creative, stating that he often acted similarly in daily life as well. One of the reasons for academic procrastination is complexity or difficulty of the task. The fact that an individual who feels anxious, worried or distressed (the emotional dimension of academic procrastination) continues to engage with the task even if under

[1] This game was developed by Bircan Kırlangıç Şimşek, who is the second author of the article and the supervisor of this study.

compulsion (behavioral dimension of academic procrastination), decreases the possibility of procrastination. In light of this information, we can say that our case feels boxed in when faced with a complicated or challenging situation, but by staying in action, he can produce a product he is satisfied with.

The third session: In this session, a group member who claimed to have a lot of academic work to do but could not start due to a variety of excuses and was therefore feeling anxious, became the protagonist. The case was the first person to be given a role and he was chosen for the role of the "emptiness". During the game, it was observed that what the protagonist defined as "emptiness" were moments of "being alone with himself/herself" so he/she tried to avoid such moments through various busy-work. After the game was completed, the case expressed that the "*moments of being alone with himself*", which were defined as emptiness, were familiar to him, that he especially needed such moments and specifically created these occasions to get his strength back, develop his inner strength, and that his inner voice was often correct. Among the reasons for academic procrastination, there are irrational thoughts/beliefs that the individual has (cognitive dimension of academic procrastination), and in a sense, the statements which the individual makes to him/herself (internal voices) when he/she encounters a distressing situation can be determinant on whether they will procrastinate or not. In light of this information, it can be stated that the language used by our case during his relationship with himself is functional and constructive, considering its positive relation with academic procrastination.

The fourth session: At the beginning of this session, the "game of joining and splitting up" which facilitates group cohesion, was played as a warm-up and the director added instructions of several dimensions related to the group theme, such as "those missing planes, trains, buses/ those who go early and wait", "those avoiding a stressful situation as if it was a plague/ those who handle stressful situations head-on", and "those who are quite meticulous when starting a task/ those who decide quickly". During the sharing section, when a person from the group of "those missing planes, trains, and buses" said they felt embarrassed, the case shared, "*I am proud because it is very exciting*." The director then asked what excited him was and he replied, "*I get an egocentric pleasure by saying that I can catch it even at the last minute. When it comes to academic procrastination, I regret not having started before, but completing the task without missing the deadline gives me an egocentric pleasure*". The fact that the individual continues engaging in problematic behavior even though it has some negative consequences, such as feeling intensely anxious and low performance, can be suggested to hold a mechanism that actually protects the individual's self-esteem with the thought: "I fulfilled the task and created a product even though it was the last minute, I could have done better if I had started earlier" (Burka &Yuen, 2008). A similarity with the words that the case shared draws attention, as well.

In addition, the game "Own your dreams" was played in this session to enable the members to examine their future dreams and the life dynamics which will facilitate or complicate these dreams. In this game, two members chose Ideal (the case) for the role that facilitates achievement of their dreams (as belief or motivation). This can be explained by the fact that Ideal was a positive model for the other members since he was at peace with his inner voice and expressed in the previous session that he was approaching the events and circumstances with a more optimistic attitude.

The fifth session: In this session, a procrastination themed warm-up game was played. During the game, the members tried to keep a balloon in the air, first in groups and then in pairs using their bodies, like a volleyball game enhanced with new instructions. The aim of this game was to give members the opportunity to realize what it feels like to act together with another person while doing a task (keeping the balloon in the air), how different the emotions at the beginning are from the ones when executing and completing the task and finally, how flexible or strict they are during the task. During the sharing section, our case was the last person to speak and he stated that he felt more nervous when in the group and took more responsibility not to drop the balloon, but felt less nervous while trying to keep the balloon in the air with only a partner. Also, that he got in harmony with his partner in a short time and tried to make the others drop their balloons due to a competitive personality. Considering these statements, he became more active in order to keep the balloon in the air (I must be successful) when keeping it in the air was defined as the responsibility of many people. In a way, he attempted to control the process more and thus felt more nervous. On the other hand, "keeping the balloon in the air" became easier after finding harmony with his partner, but even in such a situation, he still sought to drop the balloons of others rather than letting himself be free in the game. All these reveal the sort of meaning which the case attributes to "seeing success as the only

option, fear of failure, and I must be successful", which is thought to be related to academic procrastination, as well.

The case chose to be the last in the previous session's game "Own your dreams" and also in this session's game "Let yourself free", which was played to reveal and work on possible transference that might affect group work, though he did not get the chance to stage his own work as the group time was over. The case explained, "*I waited and chose to be the last one because I wanted to watch the others first; I actually would love to take the stage. If there had been enough time, I would have performed a game that I play with my brother*". With common expressions like "*If I had started working earlier (if I had not postponed and had had time) I would have done better*", individuals who procrastinate as a habit can be said to attempt to protect their self-esteem through procrastination. The fact that the case chose to watch and be the last in both individual-centered games although he had the opportunity can be identified as the behavior of self-inhibition, which is directly related to procrastination.

The sixth session: In this session, games were played with psycho-dramatic techniques to help members see how they respond to difficulties and also notice their procrastination cycles. In the first game, members paired up with one blindfolded and the other accompaniment. Each couple moved around the hall for about a minute trying to avoid obstacles created by the other members. Here, the goal is for the members to gain awareness about how they respond to difficulties (uncertainty, frustration, etc.) in relation to academic procrastination. In the second game, members were asked to think about their own procrastination cycles first and then visualize them with the help of objects. The case did not attend this session.

The seventh session: In this session, a group game was played to enable members to see and realize their level of tolerance and efforts of control towards mistakes or incompleteness, and how they are affected, as this is also related to procrastination. During the sharing section, the case mentioned that he was impressed by the game and said, "*I was very surprised that what I saw and what I interpreted were different. I see it, I examine it in all its details, I can confuse it with something else two seconds later, and I can forget it. I mean, when I looked from the outside, I said how much more this person could change it but I also did the same. I mean, I am very confident about many things, but when I took action, it became very different. I felt that I should not be so confident in myself, that is, because I always have this thing: I know what I see, I know what I hear. So, I realized that I should not trust that much".* Then when the director asked "is what you mean the fact that I sometimes can be wrong, mistaken, or have missing parts?" the case replied *"Yes, what I see or what I hear may not be what I am sure about. I should not be so sure".* This dialogue shows that the case, who defines himself as a perfectionist, realizes the flexibility in intellectual and actional terms.

The eighth session: In this session, games were played with psycho-dramatic techniques to enable members to realize their risk-taking behaviors as well as their strength in controlling what is happening. In the first game, members were asked to make a surprising move (it could be a sound or a movement) that they avoided at home or outside, which they found absurd, first by themselves and then by the group. In this game, it was aimed to raise awareness about the extent to which members can act by considering their needs or wishes in connection with internal control, which has a positive relationship with academic procrastination (Janssen & Carton, 1999). In the second game, members formed pairs and in these small groups, after one partner determined a safe space for themselves, he/she responded to each intervention of the other partner by first accepting, then rejecting, and finally being indifferent. The game ended after the opposite player went through similar processes. In this game, it was especially desired for members to review their reactions related to situations in the outside world when things did not go well, when the plan was broken, when they encountered a difficulty, etc., and on this occasion, they could gain awareness about their level of perfectionism, which has a strong relationship with academic procrastination (Akkaya, 2007). The case did not attend this session.

The ninth session: In this session, "the personality atom game" was played to contribute to the integrity of the members' self-perception and to their awareness of their own personality traits. The case, who was often the last person in the previous sessions and sometimes could not perform due to lack of time, volunteered first this time, and during the sharing section, he said "*I was the first member to take the stage today and I did not know what to do, so I was quite nervous. I had previously wanted to do so but couldn't because I was the last one. So, I wanted to be the first one this time. But I was a little surprised at this, normally my own life doesn't change that much, it*

doesn't fluctuate that much, it doesn't differ that much in a small period of time, I was surprised by this, too." and expressed that he was happy to give himself this opportunity without blocking himself and was also surprised at the change which he observed in himself in a short time (being the first, unlike before). The case also showed efficiency by providing space for "*his side that can ask for help"* during this stage, a side which he does not often use due to strong self-confidence, yet something he greatly needs. The fact that the case, who did not hide in the background but gave himself an opportunity for the first time and concretely asked for help, can be interpreted as a direct representation in his own game.

In this session, the game "I have the right" was played due to a need arising within the group and expressions such as "I have the right to make mistakes, I have the right to leave it incomplete, I have the right to fail, I have the right to be defective" etc., which can be related to academic procrastination, were used by the group members.

The tenth session: In this session, the game "Nicknames first...then" was played, and the case stated, *"Mine was Ideal, the nickname I first got, the reason is that it is a concept that shapes my life, both nourishing me and putting things in front of me as a dream, but also negative things that happen to me are because of my idealist character. So, I chose it. When I think about it today, I can change it to Tolerance, because in 10 weeks I have more realized some things here, and some things have positively and negatively changed in my life, and in this process, I have felt this: I mean, I cannot control everything in my life, I need to be more tolerant towards some things, there are things which are part of life in life and this is one of them, we don't always have everything, so I am more accepting compared to the day I first arrived, so I wanted to change my nickname to Tolerance."* And he changed his nickname to "Tolerance". This shows that through the group process, the case can gain the flexibility to act according to new conditions and situations, and can be more accepting of the conditions, regarding both himself and his environment. Also, considering that individuals who frequently engage in academic procrastination are more prescriptive, controlling, and perfectionist about themselves and their surroundings, it can be argued that through the group process, the case also experienced a significant change related to academic procrastination.

This session continued with an individual-centered group game that serves to help members examine what kind of awareness they have gained during their journey supported by group dynamics, what kind of changes have they experienced in their lives and feelings since the beginning, and what they will take with them and leave today. In this game, in which objects were also used, our case talked about what he experienced in his inner journey:

> *"I joined here in the second week, but I felt quite well as if I joined the first week, I felt myself belonging to this group. When I came, I actually had some problems related to academic procrastination and inner motivation at work and I wanted to solve them. There are actually two cars here; this one is actually the car that I used before, before I came here. There is a road I take and I was driving this car. When I came here, I wanted to go with this car (psychodrama), I wanted to go the same way in a different car, so I just wanted to change my car and see what happens. These represent that. Actually, I may have mentioned this road before, that is, I had some difficulties while writing my master's dissertation and now I am writing my doctoral dissertation. I said maybe I would not have these problems with this car."*

This depth of sharing reveals that the case provided himself an opportunity for change by experiencing what he acquired through the group process. In addition to the above, the case also mentioned that he can now become a person who enjoys life more (flexibility), that he can see the limits of his awareness—although he had awareness before—and that he wants to leave with the youthful spirit (marbles) that he acquired through this process. During the section where they exchanged gifts, the group members presented him a light to illuminate the road while he drives the car, the power to protect his wisdom, a magic wand to show his soft side, the power to produce a valuable product, the power to protect his friendly and reassuring nature, and the energy to enjoy life, as well as seeing lots of opportunities to travel (plane), the power to ignore the small obstacles in front of him, the mirror to get strength from himself, a tourist hat to continue his travels by protecting his inner child, and a rosary that he could use to ignore sometimes or to hold onto for patience.

3 | FINDINGS

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In the study, a case report of one member who joined the psychodrama experience group to get help due to difficulties experienced in the field of academic procrastination was made. As mentioned in the psychodrama group process, it can be stated that the case has acquired meaningful awareness that may be connected to both himself and his academic procrastination, in order to ensure personal integrity.

Although the target audience of the academic procrastination themed psychodrama experience group consists of undergraduate and graduate students studying at Anadolu University, the case differed from the other group members in terms of both age and education. Due to this, it was observed that the case experienced difficulty working on himself or relaxing within the group for a certain period of time. During the fourth and fifth session's individual-centered group games in which volunteering was the basis, the case preferred to be the last person and mentioned that he was willing to work on his component and that he could have performed his work if there had been enough time. When the published literature on academic procrastination is examined, it is stated that under this problematic behavior, there is the fact that the individual delays to prevent the evaluation of his/her performance and to protect his/her self-esteem (Burka & Yuen, 2008; Ferrari, 1991a, 1991b). When the person who procrastinates as a habit evaluates his/her own self-values only on the basis of competence related to the task and defines their ability only with how well he/she performs the completed task, he/she inevitably engages in some delay. Procrastination employed in this process functions as a self-prevention strategy by the individual. In light of all this information, the fact that our case does not take the stage during the games where volunteering is the basis, even if he is willing to do so, suggests that he was preventing himself due to various concerns, in parallel with procrastination's function to protect self-esteem. In the ninth session, however, the case was the first member to take the stage in an individual-centered group game and work on himself, and during the sharing section he was quoted as saying, "*I was the first member to take the stage today and I did not know what to do, so I was quite nervous. I had previously wanted to do so but couldn't because I was the last one. So, I wanted to be the first one this time. But I was a little surprised at this, normally my own life doesn't change that much, it doesn't fluctuate that much, it doesn't differ that much in a small period of time, I was surprised by this, too."* He highlighted the flexibility, the courage to take risks (making mistakes, etc.), the ability to develop a tolerance for uncertainty, and the power to let himself free, which he acquired through the psychodrama process.

The case never became the protagonist during the psychodrama experience group. However, with the role of "emptiness" during the protagonist game played in the third session, he made significant contributions to both himself and the group regarding academic procrastination dynamics. According to Ellis & Knaus (1979), among the reasons for procrastination are the irrational thoughts of the individual. The authors consider procrastination as an emotional disorder caused by irrational thoughts, which also play an incentive role in delaying the start and completion of a task. Similarly, Burka & Yuen (2008) have stated that individuals maintain irrational beliefs about being successful, they experience an intense fear of failure related to the task, and engage in delay tactics because they are worried about being judged by others. In this context, the fact that the case stated during the sharing section that he could take strength from his own self and that his inner voice often would be correct in moments of being alone, which was represented as "emptiness", suggests that he can use a more functional and positive inner voice (thinking) in challenging moments related to academic tasks. In psychodrama experience groups, members make an impression on others through sharing after a certain period of time and make meaningful contributions to other members' development processes. In other words, each member of the group is a healer for the rest (Holmes, 2013). Within this framework, the fact that two group members chose Ideal for the role which facilitates reaching one's dreams (as belief for one and motivation for the other) during their stages at the game "Own your dreams" played in the fourth session, suggests that the case made meaningful contributions to the other members' development through sharing the "positive inner voice", which can also be related to academic procrastination.

Perfectionism, which is thought to have a strong connection with academic procrastination, can be defined as "the effort to reach standards without making any mistake" (Slade et al., 1991) or "the tendency to reach or maintain unreasonably high standards" (Hill et al., 1997). It has been observed in various group games that the case, who joined the group due to complaints about academic procrastination, is particularly prone to the idea of

"I have to do the best without any failure", and he also mentioned that he has a perfectionist character. The director led the group play a group game in the seventh session in order to work on these rigid and compelling thoughts, which have a strong connection to procrastination, by taking advantage of the power of psychodrama to give individuals spontaneity and flexibility through action. During the sharing section, the case expressed with surprise how different his expectation (I saw, I should do the same) and what actually happened (taking action) were from each other, by saying that, *"What I see or what I hear may not be what I am sure about, I should not be so sure."* This argues that the case acquired meaningful awareness about himself and realized flexibility in intellectual and actional terms.

In the last session of the psychodrama experience group, the aim was for members to see and realize their own awareness and development, and to end the group process with positive emotions. For this purpose, firstly the game "Nicknames first...then" was played, and the fact that the case changed his nickname from "Ideal", which represented himself being strong and firm, to "Tolerance" suggests that he has acquired flexibility and can be more liberating (not blocking himself) in relation to himself and what is happening around him. In the individual-centered group game during the rest of the session, played in order to enable members to see and work on their awareness of the whole group process and end the process with positive emotions, the case related a positive contribution of the psychodrama experience group to his life, using a metaphorical language like "I want to go the same road (master's dissertation process - doctoral dissertation process) in a different car (psychodrama)". Also, it was observed that the case's repertoire developed through the roles he took or he was given during the psychodrama sessions, and as the role repertoire developed, he began to establish bonds and connections with the other members.

In addition to the results obtained, this study also has several limitations. The theme of the group is academic procrastination and the preparation is done on in this regard, but the group process was shaped according to the current needs of the members. In this context, the absence of a theme-specific structured group process may have rendered the intervention insufficient towards academic procrastination, which has a multidimensional nature and exhibits a settled structure. The case could not attend two of the group game sessions on academic procrastination, and at the same time, the case's awareness of procrastination was limited to the qualitative data in the group process. These factors limit our ability to make general statements from the research results.

4 | CONCLUSION AND RECOMMENDATION

It is possible to say that through psychodrama techniques, the case got the opportunity to express, see and work on, change and transform the characteristics that may be related to both himself and his academic procrastination, and in this context, he has gained meaningful awareness. Academic procrastination has a multidimensional (cognitive-affective-behavioral) nature, and was able to work together through the action-based insight feature of psychodrama. In this context, it can be stated that psychodrama, which offers the opportunity to experience skills such as spontaneity, flexibility, self-freedom and creativity through action in working with academic procrastination, is an effective and functional help delivery tool.

Based on the current studies, it would be appropriate to increase the number of sessions in further studies, considering the complex pattern of academic procrastination and its structure, which is resistant to change. Furthermore, it is considered important to include participant views in future studies to deeply evaluate the effect of psychodrama on the emotions, cognition, and behaviors of participants and its permanence. This is predicted to support qualitative data in the studies. Similarly, supporting qualitative data with quantitative data and diversifying the research design with follow-up measurements on control groups will be beneficial in the context of the ability to generalize the research results.

STATEMENTS OF PUBLICATION ETHICS

During the writing process of this study entitled "Studying Academic Procrastination with Psychodrama: A Case Report", scientific, ethical and citation rules were followed. No falsification was made of the collected data and the study was not sent to any other academic media for evaluation.

RESEARCHERS' CONTRIBUTION RATE

Researchers' Contribution Rate

Authors	Literature review	Method	Data Collection	Data Analysis	Results	Conclusion	(Supervision)
Nilüfer Uyar	☒	☒	☒	☒	☒	☒	☐
Bircan Şimşek Kırlangıç	☒	☐	☐	☐	☒	☒	☒
Ebru Güç	☒	☒	☐	☒	☒	☒	☒

CONFLICT OF INTEREST

There is no conflict of interest among the authors regarding the publication of this article

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Changes in the Lives of Middle-Aged Adults and Their Non-Formal Educational Needs During the COVID-19 Pandemic

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ABSTRACT

Throughout history, various epidemics have affected societies socially, economically, and psychologically by causing problems for humanity. COVID-19 epidemic, which started in Wuhan, China late in December, 2019 and has caused and continues to cause, millions of people in the world to get infected and a significant number of people to lose their lives. Considering the pandemic process that we are experiencing, this study aims to identify changes in the lives of middle-aged adults and their educational needs during the COVID-19 pandemic. In this case, 19 individuals who live in different socio-economic regions of Turkey participated in the study, based on qualitative research design, voluntarily, were interviewed. The data collected through a demographic information form, a semi-structured interview form, and a story completion form developed by the researchers were analyzed through content analysis. As a result of the study, it was revealed that negative psychological and economic impacts emerged; observed differences in hygiene, diet, and social life behaviors; and participants wanted to receive education on public health, COVID-19 pandemic, and information technologies.

Keywords: COVID-19, pandemic, adult education

Orta Yaş Üzeri Yetişkinlerin Covıd-19 Pandemisi Sürecinde Yaşamlarındaki Değişiklikler ve Yaygın Eğitim İhtiyaçları

ÖZ

Tarih boyunca ortaya çıkan çeşitli salgın hastalıklar insanlık için sorunlar oluşturarak toplumları sosyal, ekonomik ve psikolojik olarak etkilemiştir. Çin Halk Cumhuriyeti'nin Wuhan şehrinde, 2019 yılının aralık ayının sonlarına doğru ortaya çıkan ve halen devam etmekte olan COVID-19 salgını da tüm dünyada milyonlarca insanın enfekte olmasına ve çok sayıda kişinin yaşamını kaybetmesine neden oldu. İçinde bulunduğumuz salgın sürecinden hareketle; bu araştırmanın amacı, orta yaş üzeri yetişkinlerin COVİD-19 pandemisi sürecinde yaşamlarındaki değişiklikleri ve eğitim ihtiyaçlarını belirleyebilmektir. Nitel araştırma desenine göre hazırlanan bu durum çalışmasında, Türkiye genelinde farklı sosyo-ekonomik bölgelerde yaşayan, çalışmaya katılmaya gönüllü 19 kişiyle görüşme yapılmıştır. Araştırmacılar tarafından geliştirilen demografik bilgi formu, yarı yapılandırılmış görüşme formu ve metin tamamlama formu ile toplanan veriler içerik analizi yöntemiyle çözümlenmiştir. Araştırma sonucunda; olumsuz psikolojik ve ekonomik etkilerin oluştuğu; hijyen, beslenme ve sosyal yaşam davranışlarında farklılıkların gözlemlendiği; katılımcıların genel sağlık, COVID-19 pandemisi ve bilişim teknolojileri hakkında eğitim almak istedikleri ortaya çıkmıştır.

Anahtar kelimeler: COVID-19, pandemi, yetişkin eğitimi

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1 | INTRODUCTION

Coronavirus is a type of virus that infects people and animals, and the recent coronavirus (COVID-19) is transmitted through inhalation and contact and has not been seen before. It is revealed that the elderly and people with chronic diseases are more likely to die of this virus (Gong, 2020).

COVID-19 (also known as Coronavirus) disease appeared in Wuhan, China late in December, 2019 (Xu, Shi, Wang, Zhang, Huang & Zhang, 2020). It spread over 136 countries according to the data obtained on April 4, 2020, and this disease spread over 136 countries around the world according to the data obtained on April 4, 2020 (World Health Organization [WHO], 2020). This epidemic, which spreads fast and results in death, has brought along many social changes as well as its impacts on human health.

The first case of COVID-19 was reported in The People's Republic of China in December, 2019 (WHO, 2020). The first cases out of China were recorded in Japan, South Korea, and Thailand (Taylor, 2020). Turkish Republic announced its first case of COVID-19 on March 11, 2020, when a citizen came back from Europe (TRT News, 2020). On December 19, 2020, when the study was conducted, total number of COVID-19 cases were stated to be 2,004,285 and the number of deaths as 17,851 in Turkey (Worldometers, 2020).

Due to COVID-19 pandemic, "social distancing" has become a significant concept. Regarding the conditions under which the disease is transmitted, keeping physical distance among people has appeared to be essential. Within this framework, various precautions in various fields have been taken throughout the world. World Health Organization has sent supplies to 172 countries during this process (WHO, 2020).

Struggle with new coronavirus continues all around the world, and each country has developed its own coping system. Considering the situation in October, 2020, countries generally aim protection from the pandemic through that everybody wears a mask, common use areas are disinfected, warnings are prepared for social distancing, and indoor activities are moved to outdoors (USA Today, 2020). With the circular issued by the Republic of Turkey on September 8, 2020, wearing a mask became compulsory everywhere except for residences. Other resolutions are as follows: Standing passengers will not be allowed in public transport vehicles; no music will be allowed in cafes, restaurants and other places of entertainment after midnight; and controls will be tightened in public places like marketplaces, beaches and restaurants. It was also stated that those who violate isolation rules will be sent to dormitories to stay during their quarantine days (BBC News Turkey, 2020).

In the 4-month process from the appearance of COVID-19 to May 12, Turkey is indicated to have struggled against the pandemic by managing the healthcare system effectively within the country and also aided 44 different countries with medical supplies to meet their needs; therefore, managed the pandemic process better than the countries that are more powerful socio-economically and in health services (Budak & Korkmaz, 2020).

Social isolation is described as total or partial lack of contact among individuals in the society (Gierueld, Tilburg & Dvkstra, 2006). According to the COVID-19 report of WHO (2020), in Turkey, as in many other countries, necessary steps have been taken for social isolation starting from the emergence of the epidemic, in accordance with the statements by Chinese Government and World Health Organization, even though the most vulnerable group include people aged 65 and over, call for social isolation has addressed all individuals as the young also get infected and become carriers. Upon negligence of people regarding their responsibilities for social isolation, countries like China, the USA, Italy, India, France and Spain declared curfews. As the number of cases increased, Turkey also started to impose curfews for the weekends.

The COVID-19 pandemic, along with the impact of social isolation, has drastically changed our way of entertainment, sports habits, work and study patterns, and it is unknown whether these changes will continue over time (Moya & Willis, 2020). According to Aragonés and Sevillano (2020), with the pandemic process, the consequences of lockdown, the restriction of our freedom within the framework of a positive goal, and the perception of social risk, especially psychological well-being will be among the topics discussed frequently in the future. Especially in the medical literature, many reports have been mentioned that there are symptoms of anxiety that may worsen the course of the disease and reduce the quality of life of recovered patients during COVID-19 disease and the recovery period (Kelly, 2020). Uzunova, Pallanti, and Hollander (2020), in their study in October

2020, stated that most of the published studies evaluating anxiety and other neuropsychiatric disorders in COVID-19 patients are cross-sectional and a few of the new studies are prospective. In addition, they emphasized the importance of conducting further prospective studies with follow-up of patients after the disappearance of COVID-19 symptoms.

It is concerned in the USA that, with the COVID-19 pandemic, adults as the vulnerable group are excluded more from the society, and their loneliness and other social diseases get worse. It is considered as a big problem that especially the elderly who live alone go into depression since they cannot go out and socialize; and social communication between parents and kids, family and elders become irregular in social isolation (Ustun & Ozciftci, 2020).

Altin (2020) identifies, in her study, that discriminant concepts such as being a refugee or an old lady, being disabled or poor, living alone, having a chronic disease, lacking digital devices and failing to use them has come into prominence as COVID-19 has deepened the inequalities in the society. The elderly, who were subject to exclusion and discrimination even before COVID-19, have been exposed to greater discriminatory attitudes and behaviors with the social and physical isolation during the pandemic (Varıslı & Gultekin, 2020). Yildirim (2020) states that, besides the elderly, individuals with low socio-economic status or chronic disease, working people, healthcare workers, and those who got infected and had the disease have fallen into the disadvantaged group and may be socio-psychologically at risk after the pandemic as society's attitudes and behaviors towards these people may change.

As COVID-19 pandemic sweeps, countries have taken various measures to protect the health of their citizens. Besides social impacts on the country and society, these precautions have also had economic impacts. Both the governments and citizens have had economic difficulties since the borders were sealed, businesses like restaurants or cafes where people came together were closed, and curfews were imposed. Moreover, economic circumstances such as decreases in the stock market, increase in exchange rates and oil prices have affected countries worldwide (Sit & Telek, 2020). With the borders sealed, decreases in foreign trade have occurred and supply chain has been disrupted, which has caused big firms to stop production due to lack of material (Cinel, 2020).

The sectors that coronavirus has adversely affected the most are tourism, air travel and stock market. Countries that provide economic development based on tourism sector have prohibited or limited entry and exits to the country to protect their citizens' health (Acar, 2020; Alpago & Alpago Oduncu, 2020). Since Turkey is also one of these tourism countries, it has also been affected considerably. According to the data by the Ministry of Culture and Tourism, the number of incoming visitors in January-March period has decreased by 20,52% compared to the 2019 data (Ministry of Culture and Tourism [MCT], 2020). As for the statistics of tourism income, the number for the third quarter of the year (July-September) has decreased by 71,2% compared to the last year's data for the same quarter (Turkish Statistical Institute [TurkStat], 2020).

As well as the measures taken with the pandemic, governments have made several arrangements with the decrease in production and consumption, and the economic distress that the citizens go through. These are financial adjustments such as tax discounts, decrease in interest rates, financial support and tax deferral. Countries like Germany, France, the USA and Italy have initially rescheduled or suspended payment for taxes, supported businesses and citizens financially, and legislated economic laws. Turkey has also made a regulation to postpone some tax collection and change tax rates with the General Communique no. 518 on Tax Procedure Law dated 24.03.2020 (Bilgic Ulun, 2020).

Due to the rapid development in science and technology, the knowledge that people have learned in their childhood is not sufficient and valid in their adulthood (Akbaş & Özdemir, 2002). In his research, which aims to reveal the use and skill levels of individuals aged 45 and over, and their views on these technologies, Sutluoglu (2020) stated that the tendency to prefer traditional media has increased in individuals aged 45 and over; the rate of using a smart phone, knowing how to use a computer and the internet has decreased; revealed that the most frequently used social media environments are WhatsApp and Facebook. The most important conclusion reached in the research is that the online practices of these individuals are mostly limited to the use of these two social media environments or to practices that require only basic skills.

Trainings in the field of lifelong learning should prepare people for new conditions (Knowles, 1996). Even though the concept of adult is interpreted in different ways in many cultures, it is generally defined as the period starting from puberty, in which individuals grow to social, emotional and biological maturity, take the responsibility of their own lives and behave properly (Koc et al., 2009). World Health Organization (WHO) defines the period between the ages of 45-59 as middle age, 60-74 as old age, 75-89 as elderly, and 90 and over as senility (Arpaci & Iletmis, 2017).

Lifelong Learning activities play an important role in protecting physical and mental health by increasing active participation in life, thus may contribute to quality and productive aging of old aged adults (Rowe & Kagn, 1998). According to the Monitoring and Evaluation Report of the Directorate General of Life Long Learning in Ministry of Education (DGLLL in MoNE), the number of adults aged 45 and over who attended the courses decreased from 1,310,848 in 2019 to 651,539 in 2020. In the same report, according to the number of trainees between the ages of 25-64, the courses opened in the fields of Handicraft Technology, Health and Personal Development and Education are in the first three places in 2019, while the courses opened in the fields of Health, Handicraft Technology and Personal Development and Education in 2020 are in the first three places. It is thought that the decrease in the number of adults aged 45 and over attending the courses between 2019 and 2020 and the fact that the courses in the field of Health are more preferred compared to the number of trainees between the ages of 25-64 has changed due to the COVID-19 pandemic. In this process, according to the news published by Directorate General of Life Long Learning in April 22, 2020, volunteer master trainers working in Maturation Institutes and Public Education Centers and trainees to cover the increasing demands due to the COVID-19 pandemic, started to produce disinfectant products, especially masks, and medical overalls in their own homes and educational buildings (Directorate General of Life Long Learning in Ministry of Education [DGLLL in MoNE], 2020). This situation shows that there are changes in the institutions working in the fields of public education and adult education in accordance with the process experienced with the epidemic. In the announcement made by Samsun Public Education Center in September 24, 2020, it was mentioned that 15 Motivation, Information and Training Courses are planned during the COVID-19 pandemic process of the Directorate General of Life Long Learning in Ministry of Education. Among the courses opened are hygiene rules, communication, healthy eating, time management courses during the pandemic period (Samsun Public Education Center, 2020). During the epidemic process, it is seen that course plans are made for the needs of individuals and related to the epidemic.

RESEARCH QUESTIONS

In this study, the answer to the question of "What are the changes in the lives of over 45 years aged adults and their educational needs during the COVID-19 pandemic?" was sought. The fact that elderly people have a higher risk of death due to chronic diseases during the pandemic process and the introduction of protective practices such as lockdown played a role in the study of people in middle age. The fact that there was no research conducted within this context in Turkey was the starting point of this study whose subproblems are as follows:

1. What are adults' opinions, behaviors and attitudes that have changed during the COVID-19 pandemic?

2. What are the changes in adults' daily lives (in diet, hygiene, health, work, education, and social, economic, psychological etc.) during the COVID-19 pandemic?

3. What kind of non-formal education do adults want to receive against epidemics such as COVID-19?

This study's limitations are:

1. The size and demographic of the sample are not enough to generalize to the entire adults and Turkish public.

2. The study is limited to participants' views.

3. The data of the study was collected only via phone/video calls because of the pandemic.

4. The study was carried out when COVID-19 just popped out; hence, the literature review is limited because of the lack of previous studies.

2 | METHOD

This study which aims to identify changes in adults' lives and educational needs during the COVID-19 pandemic is a case study as one of qualitative research designs. In qualitative studies, data collection tools such as interview, observation, and document analysis are utilized, and cases are presented qualitatively in a realistic and holistic way (Yildirim & Simsek, 2018). Case studies are authentic studies in which individuals, events or institutions are investigated thoroughly and longitudinally (Turan, 2015).

In selection of the study sample, maximum variation was utilized as one of the purposive sampling methods (variation sources: gender, age, profession, education, living in rural or urban regions). Maximum variation sampling presents and defines themes including a great number of differences regarding the case investigated (Baltaci, 2018). Demographic information on the volunteers participating in the study is presented in Table 1.

Table 1. Information on Participants Aged 45 and Older in the Study Sample

Participant	Gender	Age	Education	Marital Status	Job	Employment Status	Chronic Disease	People They Live with during the Pandemic
F1	Female	62	Elementary School	Married	Housewife	Unemployed	Yes	Family
F2	Female	45	Elementary School	Married	Housewife	Unemployed	No	Family
F3	Female	48	Bachelor's Degree	Married	Officer	Employed	Yes	Family
F4	Female	49	Bachelor's Degree	Married	Officer	Employed	No	Family
F5	Female	45	Bachelor's Degree	Married	Officer	Employed	No	Family
F6	Female	46	Elementary School	Married	Worker	Employed	No	Family
F7	Female	48	Elementary School	Married	Housewife	Unemployed	No	Family
F8	Female	55	Elementary School	Single	Worker	Retired	No	Family
F9	Female	63	High School	Married	Housewife	Unemployed	Yes	Family
M1	Male	52	Bachelor's Degree	Married	Officer	Employed	Yes	Family
M2	Male	55	Associate Degree	Married	Officer	Retired	Yes	Family
M3	Male	55	High School	Married	Worker	Retired	Yes	Family
M4	Male	57	Associate Degree	Married	Officer	Retired	No	Family
M5	Male	66	Associate Degree	Married	Officer	Retired	No	Family
M6	Male	51	Associate Degree	Married	Officer	Employed	No	Family
M7	Male	49	Bachelor's Degree	Married	Officer	Employed	No	Family
M8	Male	51	Elementary School	Married	Farmer	Employed	No	Family
M9	Male	74	Bachelor's Degree	Married	Officer	Retired	Yes	Family
M10	Male	52	High School	Single	Farmer	Employed	No	Family

DATA COLLECTION

The first stage of content analysis is the coding of data. At this stage, the information obtained is analyzed, it is tried to be divided into meaningful parts, and what each part means conceptually is explained (Yildirim & Simsek, 2018). The data were collected by the researchers through video calls on the phone and their recordings. In order to ensure validity and reliability, the researchers who would hold the interviews conducted a sample interview simulation beforehand.

All the data were obtained in the first two weeks of April 2020 when the peak of COVID-19 was seen in Turkey after the pandemic was officially announced for the first time. The data were collected from 19 voluntary participants (9 females and 10 males) who were informed about the purpose of the study and ensured that their personal data would be protected. The data obtained were analyzed through content analysis. In content analysis,

similar data are gathered together within the frameworks of certain concepts and themes, and interpreted by being organized in a way that readers can understand (Buyukozturk, Kilic, Akgun, Karadeniz & Demirel, 2008). The main purpose of using content analysis is to define the phenomenon conceptually (Elo & Kyngäs, 2008). The study is limited to adults over 45 year-old living in Turkey who have not had COVİD-19.

In the study, a demographic information form, a semi-structured interview form and a story completion form were utilized as data collection tools. While developing the data collection tools, opinions of four experts, except for the researchers, were asked for, and items and stories on which agreement was achieved were included in the forms. These experts involved an adult's instructor, a psychologist, an assessment and evaluation expert, and a language expert. A pilot interview was held with two adults (a 62-year-old female and a 65-year-old male), who were not in the study sample, for the intelligibility of the questions, and some expressions were edited (e.g. "salgın" which is a word of Turkish origin for pandemic was used instead of "pandemi" as a word of foreign origin).

RESEARCH ETHICS

In this study, verbal and written consent of the participants was obtained with a consent form. Before starting to study ethics committee approval was obtained from Bartın University Ethics Committee for the research procedures. Ethical principles and rules were followed during the planning, data collection, analysis, and reporting of the research.

3 | FINDINGS

In the research, participants were addressed the questions in the forms. Themes and categories along with frequencies considering participants' responses are presented in tables. Themes were created based on the codes (Creswell, 2017).

Table 2. Knowledge of Participants on COVID-19

Themes	Sub-Themes	Codes	Female	Male
Pandemic	Disease	Symptoms of the disease	F3, F5, F7, F9	M2, M3, M4, M5, M6, M7, M8, M10
		Epidemic		
	Protection	Social distancing	F1, F4	
	Consequences	A deadly disease	F2, F3, F5, F6, F8, F9	M9
Virus	Source	A contagious disease from China	F5	M1, M3, M6
		An unknown virus		
	Spread	Infecting a large number of people very quickly	F9	M1, M2, M4, M7
		Spread all around the world		

In Table 2, it is observed that all participants were aware of the fact that the virus caused a contagious disease. About the epidemic, male participants mostly emphasized the virus as a disease whereas females also expressed their opinions on protection from and consequences of the pandemic. A female participant responded as "(…) It is a disease that leads to death; the death rate is much higher especially at older ages." (F5). When the data obtained were examined, it was identified that mostly males presented their opinions on the origin and spread of the virus.

Table 3. Knowledge of Participants on How the Virus is Transmitted

Themes	Sub-Themes	Codes	Female	Male
Contact	Human	from person to person saliva handshake speaking (to each other) by breathing cough close contact	F1, F2, F3, F4, F5, F6, F7, F8, F9	M2, M4, M5, M6, M8, M10
Through Inhalation	Matter	the necessity of keeping food hygienic		M1, M9
		money	F4, F5, F6, F7, F8	M1, M2, M3, M5, M6, M9, M10
Being Unhygienic		from other people who have the disease	F6	M8

When Table 3 is examined, the majority of the participants are observed to have stated that the virus was transmitted through contact; only two males indicated that the virus was also transmitted through contact with matter. As an example, a participant (M5) said; "It is a disease that spreads from person to person through cough, sneeze and close contact". Another participant (M9) responded as; "(…) Let's say he hits his hand to where he sits, even so it spreads". Most of the participants indicated that the virus was transmitted through inhalation. As an example, a female participant (F8) stated; "It is transmitted mostly through inhalation and contact", and a male (M3) said; "(…) People get infected through inhalation". Only two participants expressed that the virus spread as a result of unhygienic conditions. For instance, an individual (F6) stated; "If we do not wear masks and gloves while going out, we get infected through inhalation, sneeze and contact".

Table 4. Knowledge of Participants on Symptoms of COVID-19

Themes	Codes	Female	Male
Symptoms	Fever	F1, F2, F3, F4, F6, F8, F9	M1, M2, M3, M4, M5, M6, M7, M8, M9, M10
	Cough	F1, F2, F3, F4, F5, F6, F7, F8	M1, M2, M3, M4, M6, M7, M10
	Sore throat	F1, F2, F4, F7, F8	M1, M2, M7, M8
	Respiratory Distress	F5	M2, M5, M6, M9
	Weakness	F2, F5	M2, M3, M7
	Nausea and Sickness	F3, F5, F6	
	Diarrhea	F3	
	Loss of Appetite	F9	
	Pain	F4, F5, F6, F9	M5, M9, M10
	Nasal Discharge and Obstruction		M1
Symptom Number		F6	

According to Table 4, for the symptoms of COVID-19, almost all the participants responded as fever, cough and sore throat; about half of them stated respiratory distress, weakness and pain, and a small number of people indicated nausea and sickness, diarrhea, loss of appetite, nasal discharge and obstruction. Only one female participant emphasized that some people showed no symptoms at all.

Table 5. Expressions of Participants for What to Do If They Had the Symptoms

Themes	Sub-Themes	Codes	Female	Male
Consult to a Health Institution	In person	Going to hospital Go to the primary care physician Go to the ER Apply to the nearest health institution	F1, F2, F6, F8	M1, M2, M4, M5, M6, M7, M8, M9, M10
	By phone	Calling 112 Calling 182 Calling 184	F1, F3, F7, F9	M2, M4
Self-treatment		Taking antipyretic medicine	F1	M5
Talking to Familiar Healthcare Professionals		Calling a relative who is a doctor	F5	

Considering Table 5, almost all the participants specified that if they had the symptoms, they would consult to a health institution in person or by phone. As an example, a participant (M1) stated; "(…) I would go to the nearest health institution by wearing my mask". Although some participants knew that they needed to consult to a health institution, they did not know what number to call by phone. For instance, one (F3) said; "I would call the Ministry. What was the number, 180 or 187?". Two participants would prefer self-treatment at home before consulting to a health institution. As an example, one (M5) stated; "If there is something to do at home to reduce fever or ease respiration, I try them first. If they do not work, I will go to the hospital". It was observed that one participant abstained from consulting directly to a health institution. She (F5) expressed as follows: "First, I call my brother; he and his wife are doctors. Now I do not trust much actually, I may not call somewhere I do not know. First, I call the doctors around me. Then, I would do something with their guidance".

Table 6. Precautions that Participants Have Taken Against COVID-19

Themes	Codes	Female	Male
Hygiene	Washing Hands	F2, F5, F7, F8, F9	M1, M3, M6, M7, M9
	Cleaning House	F2, F4, F5,	M7, M8, M9
	Cleaning Food	F4, F5	M8
	Mask-gloves	F2, F4, F5, F6, F7, F8, F9	M1, M4, M6, M8, M9, M10
Isolation	Social distancing	F1, F4, F6, F8	M1, M3, M5, M7, M10
	Staying in	F2, F3, F4, F5, F6, F7, F8	M2, M3, M4, M5, M6, M10
Regular Life	Being or having a guest	F1, F6 F6	

In Table 6, it is observed that participants took precautions such as hygiene and isolation. The majority mentioned hand cleaning, house cleaning and use of masks and gloves whereas only three people stated food cleaning. As an example; one (M3) said; “Washing our hands and face often, using disposable napkins or closing our mouth and nose with our elbows while coughing or sneezing (…)”. The participant who mentioned food cleaning (F5) stated; “Everything that comes from outside stay in the balcony for four hours. Sometimes we leave them from night to morning”.

In addition, it is observed that participants isolated themselves by paying attention to social distancing, staying in and not being or having a guest. The majority of the participants strived for staying in, half of them for social distancing and only two females for being or having a guest. As an example, one (M10) stated; “I do not have many precautions because of where I live (village). Only social distancing. Apart from that, nothing. Yeah, when I go out, into the crowd, first I watch out for social distancing, and I wear a mask. Except for these, I do not use that disinfectant stuff and so on. Indeed, I do not go out much so I do not use”. Considering that this participant lived in the village, he did not adopt isolation methods much since his interaction with others was less compared to a person living in the city. Another participant (F2) said; “We do not go out unless it is necessary. When we do, we wear masks and gloves to protect ourselves, and we get cleaned when we return home. We pay attention mostly to hygiene”.

Table 7. Sufficiency of Precautions that Participants Have Taken

Themes	Female	Male
Sufficient	F1, F4, F5, F7,	M2, M8, M9
Insufficient	F3	M6, M10
Indecisive	F6, F8, F9	M7

Regarding Table 7, it is observed that 7 participants considered the precautions they had taken as sufficient and 3 as insufficient, 4 participants were indecisive, and 5 expressed no opinion on this matter. As an example, one of the participants (M2) stated that the measures were sufficient; "It is not an unbeatable disease if we follow the precautions," One participant (F3) specified; “I act paranoid as if it will spread from air” while another one (F6) said; “I do not know”.

Table 8. Opinions of Participants on Their Responsibilities towards the People They Live with during the Pandemic

Themes	Codes	Female	Male
Not spreading the disease	Being hygienic	F2, F4, F5, F8, F9	M2, M5, M7, M10
	Avoiding contact	F1, F3, F7, F8, F9	M3, M4, M5, M6, M10
	Self-protection	F9	M1, M6, M9
Psychological support	Psychological support		M2
Creating awareness	Warning family members when necessary		
	Warning family members about nutrition and sleep patterns	F2, F6	M8

According to Table 8, only one participant mentioned the importance of psychological support, and three of creating awareness. As an example, one male (M3) said; “Not to hug, kiss, shake hands, eat from the same plate, drink from the same glass, use the same towel, and if necessary, not to sleep in the same bed”. Moreover, another male (M2) stated; “I live with my wife, and we have mutual responsibilities. Physically, we pay attention to hygienic measures. Psychologically, we support each other, and try to keep our spirit high”.

Table 9. Opinions of Participants on Their Responsibilities towards the Society during the Pandemic

Themes	Codes	Female	Male
Isolation	Not transmitting the disease		M1, M4, M6, M7, M10
	Staying in	F1, F2, F4, F5, F8	M2, M3, M4, M5, M7,
	Social distancing	F3, F8	M2, M9
Hygiene rules	Wearing mask-gloves	F9	M2
	Washing hands		
Creating awareness	Informing our relatives about the epidemic	F6, F7	

Considering Table 9, it is observed that all the participants who thought they were responsible towards the society not to spread the disease were males; half of the males in the sample mentioned the subject. A large part of the participants addressed the importance of staying in, and very few participants mentioned social distancing, use of mask and gloves, and awareness-creating. Some responses are as follows: “As if I had the disease, I do not go into crowds” (M7), “It is necessary not to accept guests, and we need to talk on the phone with the people in the distance” (F1), “Our responsibility towards the society is not to go out and transmit the virus if we had it. You need to protect others and contact no one if you go out” (F8), and “Wearing a mask and gloves while going out, and after we are done, throwing them in the trash not on the streets” (M2).

Table 10. Reasons for Participants to Find COVID-19 Dangerous

Theme	Codes	Female	Male
Consequences	Contagious	F1	M2, M3, M5, M7, M8, M10
	Fatal		
	Causing too many deaths	F2, F4, F5, F6, F7, F8, F9	M1, M3, M4, M8, M9
Concern for the future	No cure	F3, F8	M2, M4, M9, M10
	Uncertainty		M1, M9, M10
	Distrust in healthcare system	F5	

In Table 10, it is observed that the majority of the participants found COVID-19 dangerous as they defined it as fatal. Almost all the males mentioned its contagiousness. In addition, males, more than females, expressed that there was no cure for the disease. Only three males stated to find COVID-19 dangerous due to uncertainties. Some responses are as follows: “Of course, I find it dangerous, quite dangerous indeed. It is a mysterious enemy. Once there were diseases like plague and others, it is similar” (M8), and “I do not trust in the healthcare system. I do not

think I would survive if I got infected" (F5). In F5's statements, it is observed that there is a relationship between trust in healthcare system and surviving the disease. One participant said; "Sure, it is dangerous; there is neither a cure nor a vaccine, and most of the infected people are dying" (M4) while another stated; "(…) As I cannot imagine to what extent the consequences of COVID-19 will go, I find it very dangerous" (M1).

Table 11. Danger Scores that Participants Indicated for COVID-19 "from 1 (the Lowest) to 10 (the Highest)"

Themes	Codes	Female	Male
Low risk	1		
	2		
	3		
	4		
Average risk	5		M5
	6		M5
	7	F4	M7
High risk	8	F1	M3, M7
	9	F2, F3	M3
	10	F1, F5, F6, F7, F8, F9	M1, M2, M3, M6, M8, M9, M10

When Table 11 is examined, it is observed that none of the participants gave a score below 5, and almost all of them selected 9 and 10 as the highest danger score, which indicates that they considered COVID-19 as very dangerous.

Table 12. Concerns of Participants Regarding COVID-19

Themes	Codes	Female	Male
Concern for the future	Losing beloved ones	F3, F4, F9	M4
	Uncertainty	F2, F5, F8,	M3, M4, F2, M7, M9
	No treatment	F5	M1, M2
	Fatality		M1, M3, M8
	Infectiousness	F2, F5, F6, F8	M1, M5, M6, M7, M9, M10
	Social awareness	F5	M9
	Inadequate healthcare service	F5	
No concerns	No fear or worry (linked to religious belief)	F1	

It is observed, in Table 12, that most of the participants expressed their concerns for the virus as contagiousness and the uncertainty. For instance, some of their statements are as follows; "I see it as a worldwide disease that can spread more" (M5), "Well, every time I go out, I concern about whether the person near me is infected and spreads the virus" (F8). Few participants mentioned losing their beloved ones (mostly females), absence of a cure, fatality of the disease (all males), lack of social awareness and inadequate healthcare system. A participant said; "I have many concerns. For example, we have become distant. Even we cannot hug our kids. We stay away from everyone" (F9). Only one participant claimed to have no concerns stating; "I have no fears or concerns, I have faith. If it is our destiny to die of this disease, there is nothing to do" (F1).

Table 13. Changes in Opinions and Behaviors of Participants during the COVID-19 Pandemic

Themes	Sub-Themes	Codes	Female	Male
Individual effects	Being more hygienic	Cleaning the house often Disinfecting grocery store food Washing hands frequently	F4, F5, F7	M1, M2, M6, M10
	Estranging oneself from social life	Not to receive guests Not going to the bank and the post office Prohibition on people over 65 years of age Not being able to meet friends	F3, F5, F6, F7, F8	M1, M3, M4, M7, M8, M9, M10
	Adverse effects on the economy	Increasing in market prices Economic developments in the world	F3, F4, F6, F8, F9	
Social effects	Adverse effects on psychology	Having constant anxiety The fear of death Mistaking any disease for covid	F1, F3, F5, F6, F8, F9	M3, M6
	Distrust in government	Inadequacy of government policies Regional economic impact	F3, F4, F5	M10
	Realizing values	To appreciate what we have That restrictions may occur against our will	F4	M2, M5

As seen in Table 13, the majority of the participants expressed to have estranged themselves from social life. Five females cited the economic effects of the pandemic. For instance, one participant stated; “Physically, we have already locked ourselves in the house. I feel like I am in prison. Psychologically, I am always concerned about what will happen tomorrow. I feel depressed, extremely. Unwillingness to do housework, constantly thinking that I have the symptoms, paranoia… Economically, we have not felt any impact yet but probably we will in a month, because of my husband’s work. I do not think that measures taken in Turkey are enough” (F3). Another participant responded; “(…) Economically, there is no change” (F4). Nearly half of the participants mentioned the adverse effects they have experienced psychologically. For example, one male described the negative situation he had stating; “When I touch somewhere, I want to wash my hands and clean somewhere immediately. When I go out and get in the car, I cannot feel comfortable; I believe I will get infected at once” (M3).

Table 14. Subjects on which Participants Want to Receive An Education against pandemics like COVID-19

Theme	Sub-Themes	Codes	Female	Male
Digital competence	Internet use	Mobile banking Smart phone		M1
	Health	Health class in schools First aid traning	F3, F6	M3, M5, M7, M8, M9
	Hygiene		F5	M8
COVID-19	Effects of COVID-19	Symptoms of COVID-19 Treatment of COVID-19 Protection from COVID-19	F2, F5, F7, F9	M1, M4, M7, M10
Health literacy	Not considering education	Praying Having enough knowledge	F1, F4	M2, M6
	Modes of transmission	Getting information from an expert	F8	M1, M10

According to Table 14, almost half of the participants would like to receive education on health, six people on COVID-19 treatment, and only one person on symptoms of the disease. Some statements are as follows; “I would like to take first aid training. If we had known first aid, we would be able to respond to an emergency on our own. I feel incomplete” (M5), and “I would like to have training on what needs to be done primarily and what may be done at home” (F5). Four participants, as two females and two males, indicated that they did not think of receiving any kind of education. One of these females (F1) was a primary school graduate, and the other (F4) was a university graduate. The former stated; “There is no subject that I would like to be trained for, we only pray to Allah to be healthy” (F1) whereas the latter cited; “I think what I have already known is enough, I am not thinking of taking any training” (F4).

In the study, opinions of participants on certain subjects during the COVID-19 pandemic were taken through story completion method. Relevant themes and frequencies are presented in the tables.

Table 15. Opinions of Participants on Holding a Wedding during the Pandemic

Themes	Female	Male
Postponement	F5, F7, F8	M1, M2, M4, M6, M8,
Cancellation	F1, F2, F3, F4, F6, F9	M3, M5, M7, M9, M10

As it is seen in Table 15, during the COVID-19 pandemic, participants prefer not to hold a wedding on the day planned beforehand considering the benefit of the society.

Table 16. Opinions of Participants on Whether They Would Get Back on Task If They Were Retired Healthcare Workers and Needed during the Pandemic

Themes	Sub-Themes	Codes	Female	Male
Affirmative	Conditioned	Risk of transmitting COVID-19	F1, F4, F8	M7
	Unconditioned	Postpone the wedding	F2, F3, F6, F7, F9	M1, M2, M3, M4, M5, M8, M9, M10
Negative		Probability of worse	F5	
Indecisive				M6

It is observed in Table 16 that almost all the participants expressed that they would go back to work if they were retired healthcare workers when necessary in the COVID-19 process.

Table 17. Sources that Participants Find Reliable during the COVID-19 Pandemic

Themes	Codes	Female	Male
Ministry of Health and Science Committee	News channels	F1, F3, F6, F9	M1, M6
	Healthcare professionals	F8	M2, M5, M6, M7, M9
Specialist doctors		F2, F4, F5, F6, F7, F8, F9	M3, M4, M10
	President	F1	
	Academic resources and the internet	F5	

Considering Table 17, nearly all the participants relied on the Ministry of Health, the Science Committee and healthcare professionals like specialist doctors. One participant stated; “Actually, there are different statements on every channel. As we have no other chance, I want to believe what the members of the Science Committee declare. We want to trust them, their statements, the information they give. I think no one other than healthcare professionals should give information. Each person speaks differently. They confuse people. When healthcare professionals talk, you can at least implement what you hear from them. Also, you do not get panicked because when everyone speaks differently, people get panicked. Fear, alarm… I think it is healthier when doctors give information” (F8). A female participant expressed to rely on information given by the president, and another

female on academic resources and information on the internet. The former stated; "I pay attention to the words of our president who is honest and trustworthy" (F1).

Table 18. Opinions of Participants on Helping Old and Helpless Neighbors for Shopping and Pharmaceutical Errands during the Pandemic

Themes	Codes	Female	Male
Those who help	In person	F2, F4, F5, F7, F8, F9	M1, M2, M4, M6, M8, M9
	Through someone	F1, F3, F6	M5, M7, M10
Those who do not help		F3	M3

When Table 18 is examined, it is observed that almost all the participants claimed to help in person or through someone. Only two participants as one male and one female indicated that they would not help. Some responses are as follows; "I would go and help without any hesitations. I do not know what the future holds for me; I could be in the same situation so I would help as far as I could (M1), "As I am a carrier, I would absolutely decline. I would stay away and refer to someone else, someone healthier" (F3), and "If I had the risk of dying, I would not put myself on the line" (M3).

4 | DISCUSSION & CONCLUSION

This study investigating the effect of COVID-19 pandemic on adults and their needs was conducted with 19 participants as 10 females and 9 males from different cities of Turkey, and it was intended to identify changes in adults' lives, their reactions to the pandemic and their educational needs. In the study, demographic features such as gender, age, profession, and level of education were taken into consideration. Due to the pandemic, the research data were obtained from interviews held via communication tools.

According to the study by Atalan (2020), the lockdown as one of the precautions taken against the COVID-19 pandemic have had adverse impacts on human psychology as regards to stress level and depression. It was observed that the majority of the participants in this study also referred to negative effects or it was inferred from their statements. Possible psychological conditions that COVID-19 caused in the society are panic, fear, rage, excessive optimism and sorrow, and especially those with weakened immunity or chronic disease fall into anxiety, depression and fear more easily since they are more prone to get infected (Liu, Zhao, Ji, Liu, Zhang, Mou & Shi, 2020). Recently, COVID-19 has become grounds for the fear of dying in panic attack patients. When anxiety cannot be brought under control, high level of stress is observed in individuals (Aslan, 2020). In this study, as well, participants with weakened immunity and chronic disease had such statements as "(…) I have the paranoia that the disease will spread from the air", "(…) you feel uneasy; get scared" and "Even if I do not go out, I wash my hands, just in case". During the COVID-19 pandemic, controlled anxiety has become a condition.

Tarhan (2020) highlights that social distancing, which has become a necessity with the COVID-19 pandemic, may cause alienation, isolation, increasing fear, anxiety and weakening trust bonds in time. It is essential to maintain social bonds while keeping social distance during this process. Positive thoughts, behaviors and statements strengthen the immune system while fighting against viruses. Therefore, it is important to replace habits and behaviors with the right ones (Aslan, 2020). In the relevant evaluation report, Police Academy (2020) notes that, as a result of physical isolation, people share confined spaces with monotonous activities, have to communicate only through the internet and phones, and spend long hours on the internet and social media aimlessly, which may affect social relationships adversely in the long run. Goka (2020) indicates that behavioral and mental changes occurring as the features of "anxiety age" and "fear culture", which already exist before the pandemic, strengthen and spread, will be involved in social psychology and threaten mental health with psychopathologies such as "trauma", "sorrow", "feeling of isolation", "negativities in socioeconomic field", and "compliance problems", which affect large masses throughout the pandemic. It is observed that our ability to get

together with our loved ones under limited conditions, our ability to share the feelings of those who experience painful situations from a distance, and the uncertainties in our expectations about our jobs and the future of our relationships negatively affect our psychological health. Education enables individuals to look at the life from different perspectives. Education is expected to develop awareness and understanding in individuals. In this case, it can be said that individuals' skills such as self-efficacy and self-esteem will develop through their developing new interests and emerging potentials (Hammond, 2004). In terms of providing continuity in learning, lifelong learning and adult education can be expected to positively affect mental health.

In the study, it was identified that females, compared to males, mentioned negative psychological impacts of the pandemic more while responding to the question "What are the changes in your opinions (on health, economy, society, government etc.) and behaviors (in diet, hygiene, visits and travels etc.) during the COVID-19 pandemic?". Malesza and Kaczmarek (2020), in their study, present that epidemic-related anxiety levels are higher in females compared to males. A significant relationship could not be found between anxiety level and genders as in this study.

Regarding the responses obtained, the individuals participating in the study during the COVID-19 pandemic did not experience economic distress in general. It was considered to be because most of them were officials and had no salary deduction. On the other hand, some participants (F3, F5) indicated that they anticipated economic problems due to the jobs of their husbands or the economy of the country.

Some participants in the study indicated that news sources could lead to confusion and accordingly to anxiety. They stated; "Each person speaks differently. They confuse people. (…) when everyone speaks differently, people get panicked. Fear, alarm…". This finding is supported by a study revealing that the most frequently encountered item in both females and males for COVID-19-related fears was specified to be the anxiety while watching relevant news and social media posts (Hizli Sayar, Unubol, Tarhan, 2020).

Healthcare professionals actively working in the pandemic are at higher risk of getting infected compared to other citizens. Consequently, they experience several psychological impacts such as fear, anxiety and depression besides physical ones like fatigue, dizziness and shortness of breath. Some other studies also reveal that psychology of those who work in healthcare during the pandemic is adversely affected (Liu et al., 2020). Da Silva and Neto (2020) state that, during the pandemic, healthcare professionals have mental disorders at higher rates, their scores for anxiety and depression are considerably high, and mental disorders are more common in those who work more closely to infected patients. It can be inferred that psychological situations like anxiety and depression have been on the increase since the outbreak of COVID-19 epidemic. It is acknowledged that some relevant associations and companies related to mental health in Turkey conduct studies in order to provide mental health services online. This kind of support studies and services offered during the COVID-19 pandemic have been discovered to be effective in Turkey and throughout the world (Mehra, Sahoo, Suri, Malhotra, Yaddanapudi, Puri & Grover, 2020).

The study revealed that some participants tended to cope with problems by depending on religion, associating COVID-19 pandemic and problems they faced with God, interpreting them favorably and expecting the remedy from God again. It is observed that individuals depend on religion more in their problems as they get older. In addition, educational background and where they live affect their dependence on religion (Batan, 2016). Participants who thought that the pandemic started by Allah and would be ended by Him were primary school graduates and inhabitants of small towns, which coincides with the research findings of Batan (2016). Individuals adopt positive religious coping methods such as praying, praising and thanking Allah, and thinking that "every cloud has a silver lining". Positive religious coping method is described as the method that individuals employ in order to solve a problem by getting strength from spirituality and conceding (Pargament, Smith, Koenig & Perez, 1998).

One sub-purpose of the study is to discover the subjects about which individuals feel inadequate and would like to receive education in case of COVID-19 or another pandemic. The results of the analyses conducted within this context have revealed that participants mostly have worried about the cure of the disease and want to obtain information or take training on symptoms and treatment of the disease, and prevention. Moreover, it can be inferred

from that participants also think of taking training on general health issues and first aid, they want to protect themselves and their beloved ones from any kind of trouble to be faced. There are also some participants who do not consider taking any training or education due to several reasons like faith in God and finding themselves and precautions adequate. Furthermore, because of the problems that they have experienced in daily life during the pandemic, some participants desire to receive education on subjects such as use of internet, hygiene and transmission ways of the disease.

In traditional families, responsibilities are shared based on gender. Men mostly handle stuff like gardening and repairing whereas women are responsible for housework like cooking, dishwashing and cleaning (Gunay & Bener, 2011). Imamoglu (1993) notes that, in terms of social gender roles, the situation is not different for women who work, and distributions of tasks in families are not equal. In the study, only female participants, whose employment statuses vary as employed or unemployed, are observed to have expressed their opinions on protection from the disease in lockdown throughout the COVID-19 pandemic. In addition, educational backgrounds of these participants are different from one another, which shows that social gender roles have an impact on every level of education.

According to the study, even though some participants know that they can reach health institutions by phone, they do not know the number to call. That individuals do not use media organs effectively or follow them sufficiently and carefully can be considered as a reason for this situation, and they do not have a simple level of knowledge about accessing health services. In this direction, it can be concluded that individuals' media literacy, digital competencies and health literacy are not sufficient. When non-formal education programs are examined, it is seen that adults are trained with course programs in these fields (HBÖGM, 2022). It is anticipated that directing adults to these course programs will have a positive effect. Most of the participants are observed to have taken basic precautions such as staying in and wearing mask and gloves. With respect to this, both positive and negative situations have been encountered in Turkey. Besides those who respect the ban and pay attention to wearing masks in public transport (Haberler, 2020), there are also people who ignore the rules, do not use masks properly as it is required (mask below nose or on the chin, carried on the arm etc.) (Sozcu, 2020). In addition to this when it comes to opinions on holding wedding ceremonies during the COVID-19 pandemic, all of the participants expressed that they would cancel or postpone the wedding. When the situation in Turkey is examined, it is observed that wedding ceremonies were held outdoors although it was banned (Sozcu, 2020), some businesses continued to run their wedding venues during the lockdown, (BirGun, 2020), and rules for weddings issued in the circular were sometimes violated (Sputniknews, 2020). The reason for this can be explained by the following: COVID-19 is not taken seriously enough, and information literacy and media literacy skills are not sufficiently embedded in individuals. It is thought that the fact that covid is not taken seriously enough is closely related to the mentioned literacy. When the findings of this study are examined, it is seen that some individuals do not have enough access to information about COVID-19, and they do not know what the right resources are to reach. Unlike negative cases, it was identified that the majority of the participants in this study knew how to protect themselves from the epidemic so they would help a helpless individual in person or through someone else. Considering that participants accepted to help a sick person through someone, it was understood that they had knowledge of the potential to be a carrier. It can be inferred that the participants making this statement follow media organs actively.

The majority of the participants are observed to be conscious about not spreading the disease. In Turkey during the time period when the study was conducted (March-April 2020), “Life Fits in Home” and “Stay Home” slogans were actively used on media organs and social media. The subject was pointed out on social and mass media via hashtags (#). Based on this, it can be stated that participants considered staying home as a responsibility towards the society. This is a good example of the importance of having digital competence and using media literacy skills in effectively using the right information in life. When the findings of this study were examined, it was seen that adults wanted to learn to use technological tools such as mobile banking and smartphones, and the internet in general. This shows that the digital competence of middle-aged adults is not sufficient. Individuals in this age group should be directed to courses created to improve their digital skills. Also, courses in this field should be more accessible.

When the participants in this study were asked about the resources that they found reliable, some responded as “the president”. Some gave other country leaders as examples for informing the public as they saw in the news and specified that they expected the government to give exact information and lead the public properly in Turkey,

as well. As a matter of fact, during the COVID-19 crisis, a process of obedience to the state authority has been experienced with transformations in social behaviors as the struggle for survival is imposed through compulsory volunteering along with partial or controlled sanctions by the government (Cingoz, 2020). The most important reason for that an authoritarian orientation is being discussed in this process may be the fear caused by the COVID-19 pandemic. As the threshold of fear increases in a society, areas of rights and freedoms easily narrow, and the person drawn into fear assents to every proposal offered in order to get rid of the fear (Karakas, 2020). Therefore, even though the fear of death caused by COVID-19 has forced them to stay away from certain habits, it makes it easier for governments to ensure that the public conform to implications and restrictions put into practice to prevent the epidemic. Dependence and reliance on the government and political power representing the state authority can be associated to the prevention/struggle for survival together with fear and despair in a sense. Even though some participants in the study expressed their loyalty to and trust in the president as a representative of the state authority during the pandemic, a study presents that coronavirus struggle of some democratic countries including Turkey, South Korea, Germany etc. eliminate the myth that only authoritarian regimes can fight against the pandemic effectively (Ulutas, 2020, 12).

Based on the results obtained in the study, suggestions for prospective research and implications are presented below.

- Since the study was conducted with middle aged adults, it can also be conducted with participants from different age groups.

- As a result of this study, it was determined that middle aged adults were not aware of their educational needs enough. For this reason, awareness seminars for common fields can be given. Public Education Centers or institutions like universities can organize these seminars.

- Considering the literature review, it is observed that there is limited research on psychological effects of COVID-19 in our country and in the world. Relevant studies are required.

STATEMENTS OF PUBLICATION ETHICS

We declare that the study has no unethical problems and ethics committee approval was obtained from Bartın University Ethics Committee.

RESEARCHERS' CONTRIBUTION RATE

The authors involved in the research contributed equally.

CONFLICT OF INTEREST

This study does not have any conflict of interest.

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Content and Language Integrated Learning from the Perspectives of English Language Teachers

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ABSTRACT

The aim of the study is to explore the perspectives of English language teachers about content and language integrated learning (CLIL) after their preparation of lesson plans and accompanying materials in line with the language-driven CLIL approach. The participants are five English language teachers who are enrolled in the MA program in the department of English Language Teaching (ELT) at a state university in Turkey. After receiving adequate theoretical background, they were given time to develop three language-driven CLIL lesson plans following the steps of a lesson template. When the participants completed each lesson plan based on the contents they chose, they received feedback from their peers and revised their lesson plans accordingly. At the end of the whole lesson planning procedure, their lesson plans were analyzed to uncover their CLIL lesson plan preferences in terms of content. Also, by means of semi-structured interviews, their perspectives about the lesson planning process and in what ways the process contributed to their improvement were revealed. It was found that the CLIL lesson planning process and its contribution to their improvement in certain areas were generally perceived positively. Thus, it can be suggested that English language teachers should be encouraged to develop CLIL lesson plans.

Keywords: English language teachers, content and language integrated learning, lesson planning.

İngilizce Öğretmenlerinin Bakış Açılarından İçerik ve Dil Entegreli Öğrenme

ÖZ

Bu çalışmanın amacı, İngilizce öğretmenlerinin dil odaklı içerik ve dil entegreli öğrenme (İDEÖ) yaklaşımı doğrultusunda ders planları ve beraberindeki materyalleri hazırladıktan sonra İDEÖ hakkındaki bakış açılarını ortaya çıkarmaktır. Katılımcılar, Türkiye'de bir devlet üniversitesinin İngiliz Dili Eğitimi (İDE) bölümünde yüksek lisans programına kayıtlı beş İngilizce öğretmenidir. Yeterli teorik altyapıyı aldıktan sonra, katılımcılara bir ders şablonunun adımlarını takip ederek dil odaklı üç İDEÖ ders planı geliştirmeleri için zaman verilmiştir. Katılımcılar seçtikleri içeriklere göre her ders planını tamamladıklarında akranlarından geri bildirim almış ve ders planlarını bu doğrultuda revize etmişlerdir. Tüm ders planlama sürecinin sonunda, içerik açısından İDEÖ ders planı tercihlerini ortaya çıkarmak için ders planları analiz edilmiştir. Ayrıca yarı yapılandırılmış görüşmeler aracılığıyla katılımcıların ders planlama sürecine bakış açıları ve sürecin gelişimlerine ne şekilde katkı sağladığı ortaya konulmuştur. İDEÖ ders planlama sürecinin ve sürecin belirli alanlarda gelişimlerine katkısının genel olarak olumlu algılandığı tespit edilmiştir. Bu nedenle, İngilizce öğretmenlerinin İDEÖ ders planları geliştirmeye teşvik edilmesi önerilebilir.

Anahtar kelimeler: İngilizce öğretmenleri, içerik ve dil entegreli öğrenme, ders planlama.

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1 | INTRODUCTION

Introduced as a curricular innovation and an adaptable teaching approach (Brown, 2015; Eurydice, 2006), CLIL is known today as a general term used to refer to integrating content and foreign language learning (Banegas, 2013). It is often argued that language and content are inseparable and one cannot be learnt or taught without the other (Ball et al., 2015). Therefore, CLIL is now embraced by many educational authorities worldwide as a means of holistic learning (Banegas, 2020), and it is more frequently applied to improve language learners' linguistic competence and cognitive flexibility (Coyle et al., 2010; Hemmi & Banegas, 2021). In addition to its benefits arising from its dual focus nature, CLIL is also believed to provide a safe learning environment, maintain authenticity in the classroom, pave the way for scaffolding and active learning (Mehisto et al., 2008) as well as fostering learner autonomy, co-operative learning and critical thinking skills (Mehisto, 2012).

It is also emphasized in the relevant literature that CLIL provides numerous advantages for teachers when they actively participate in the CLIL materials development process. For example, it is indicated that the experience of designing CLIL materials in line with the local context as well as the cognitive and linguistic needs of the learners is not only more appealing to the learners but also more likely to result in new opportunities for teachers' professional development (Ball, 2018; Banegas, 2010, 2016; Banegas et al., 2020; Morton, 2013). Especially, on account of the materials constraints in the field of CLIL, teachers should develop their own materials by revealing their students' preferences about topics, activities, and sources of input to make learning more meaningful to them (Banegas, 2012). It is pointed out that CLIL teachers often have lower levels of confidence resulting from the lack of adequate level of language skills so as to adopt a CLIL approach, and thus need to increase their understanding of CLIL (Lorenzo et al., 2010); therefore, they should be encouraged to engage in the CLIL materials design process (Wolff, 2012).

Particularly in English as a foreign language (EFL) contexts such as Turkey, some private schools implement a CLIL approach, and teachers in such schools generally feel under pressure because they need theoretical knowledge and experience about the implementation of CLIL (Kassymova & Çiftçi, 2020). However, to the best knowledge of the researcher, although there have been many studies investigating the contribution of CLIL lesson planning and materials development process to English language teachers' professional development in a number of contexts (Banegas, 2012, 2015, 2016, 2020; Banegas et al., 2020; Coonan, 2007; Grandinetti et al., 2013; Kewara & Prabjandee, 2018; Moore & Lorenzo, 2015), no such studies dealing with CLIL in the EFL teacher education context of Turkey have been carried out so far. Therefore, this study aims to explore the perceptions of a group of in-service English language teachers in Turkey regarding the language-driven CLIL lesson planning process.

TYPES OF CLIL

While any combination of content and language can be regarded as some form of CLIL (Ball, 2009), Ikeda (2013) differentiates between two types of CLIL: content-driven (hard) and language-driven (soft) CLIL. He states that hard CLIL requires the presentation of academic subjects (e.g., science) in the English language by content teachers. This type of CLIL is known to prioritize the teaching and learning of the content, and the assessment procedures in hard CLIL are based on students' content knowledge instead of their linguistic knowledge (Met, 1999). On the other hand, Ikeda (2013) points out that soft CLIL is the type of CLIL presented by language teachers using content only as a vehicle emphasizing language learning. English programs in language-driven CLIL contexts cover specific contents in an organized manner (Snow, 2014), and the contents in such contexts have the potential to contribute to the language learning process (Banegas, 2020).

Banegas (2015) also acknowledges that in language-driven CLIL, teaching content-specific vocabulary is prioritized, and content is used as context for genuine language input and output; moreover, special attention should be paid to the authenticity and visual attractiveness of the materials. It is claimed that hard CLIL has been more commonly studied by researchers and applied in language programs, and soft CLIL enabling students to improve their foreign language skills by means of contents from various disciplines is likely to grow in the field of ELT, particularly in EFL contexts as its popularity goes beyond Europe (Ikeda, 2013).

4CS FRAMEWORK AND LANGUAGE TRIPTYCH

Whether a language-driven or a content-driven CLIL approach is implemented in an English language program, there are some basic principles that need to be taken into consideration while developing CLIL lesson plans and materials (Martín del Pozo, 2016). As McDonough et al. (2013) indicate, a concept and a framework are required to plan teaching and to design CLIL materials in line with the CLIL pedagogy. One of these frameworks was developed by Coyle et al. (2010) under the title of 4Cs including the following basic principles of CLIL all of which begin with the letter "C" to help teachers to integrate content and language into their classes: content, communication, cognition and culture. Coyle et al. (2010) also proposed the language triptych to scaffold learners' use of language by enabling the analysis of language. Thanks to the language triptych, language activities are organized in order that materials can expose learners to the following: language of learning, language for learning and language through learning (García Esteban, 2013).

The 4Cs framework (Coyle et al., 2010) starts with content which refers to the theme. In this component, the originators of the framework emphasize that effective language learning occurs while learning the language thematically through the content deriving from various fields, such as history and science. The second component of the framework is communication exceeding the traditional limits of grammar instruction; thus, it is maintained that students learn the language to be able to use it and benefit from it to learn new knowledge. In the 4Cs framework, the third component is cognition which is closely associated with the importance of challenging learners to construct new skills and knowledge by means of active engagement in cognitive processes without relying on an expert's transmission of knowledge. The final component of the 4Cs framework, on the other hand, is the culture aiming to increase learners' awareness of their own culture and the other cultures; moreover, thanks to the authentic culture-appropriate CLIL materials, learners can be provided with the basics of global understanding, intercultural awareness and a realization of similar and different aspects of cultures.

On the other hand, from the perspective of the language triptych developed by Coyle et al. (2010), the language of learning (e.g., the language of science) is an analysis of the language which learners are in need of in order to get access to essential skills and concepts about the content in the CLIL context. As exemplified by these researchers, a learner might need to use simple past tense in a science lesson, and he/she can be scaffolded through the creation of a learning environment where certain phrases are used meaningfully and suitably to the content of the lesson instead of the formal instruction of the past form of verbs. Secondly, the researchers argue that language for learning pertains to the language which students are supposed to learn to survive in a foreign language context. They also suggest that using the language effectively is difficult for students and for this; they need strategies and skills, such as pair work and group work as well as the knowledge of speech acts (e.g., describing, making conclusions). Finally, language through learning is based on the idea that learning occurs by means of both language and thinking, and unlike traditional language classrooms, learners in the context of CLIL are in need of learning the language to improve their cognitive processes mentioned in the language triptych while gaining language competencies at the same time (Coyle et al., 2010).

CLIL LESSONS AND MATERIALS DEVELOPMENT

The aforementioned 4Cs framework and the language triptych are known as tools aiming to enable English language teachers to incorporate content and language in their lessons plans and materials (Coyle et al., 2010). These frameworks are deemed to be essential because the lack of CLIL materials is frequently discussed in the CLIL literature; for example, it is stated that the limited number of ready-made CLIL course books and other CLIL materials is one of the handicaps for the successful implementation of a CLIL approach (Banegas, 2010, 2014). Appropriate context-sensitive materials (e.g., visual aids) dealing with the integration of content and language are generally missing (Catenaccio & Giglioni, 2016), and the unavailability of CLIL materials has always been a pressing issue throughout the CLIL context of Europe (Ball, 2018).

Approaching CLIL as a novel concept for language teachers, Sasajima (2019) maintains that CLIL materials development is crucial for the professional development of the teachers. In a similar vein, it is asserted that specifically the preparation of language-driven CLIL materials by the language teachers is likely to foster crucial characteristics, such as teacher motivation, identity and autonomy (Ball, 2018; Banegas, 2013). To illustrate, Banegas (2013) ascertained that the teacher-prepared language-driven CLIL materials development process in his study led to the professional development of the teachers through the following: collaboration among teachers, the

awareness that CLIL is a feasible approach to be adopted even in programs in which students have been subjected to traditional language instruction, the negotiation of syllabus and the enhancement of teacher-derived principles described by the researcher as the foundation of CLIL didactic transposition. His action research study concludes that there is a need for equal participation as well as autonomy in terms of planning CLIL lesson plans and materials.

In another study in the same vein, it was discovered that teachers who were given the freedom to design their own CLIL materials by resorting to Internet sites developed for pedagogical purposes felt more motivated to prepare materials as they were not restricted only to printed sources (Coonan, 2007). Teacher-prepared CLIL materials were also found to have the potential to create teacher awareness about issues such as prioritizing the focus on content over explicit instruction of linguistic rules (Banegas, 2015). In a more recent study, Banegas et al. (2020) uncovered that university EFL teachers who were engaged in a CLIL materials development procedure following a CLIL workshop improved their pedagogic, content and linguistic knowledge as well as their identity, agency and motivation as CLIL materials designers. Therefore, it is suggested by Banegas (2017) that in-service teacher education programs should incorporate a component dealing with the preparation of CLIL lesson plans and materials sticking to a framework such as the one devised by Coyle et al. (2010).

From the aforementioned literature dealing with different aspects of CLIL teacher education, it is realized that CLIL lesson planning and materials design offer numerous advantages for in-service English language teachers (Kewara & Prabjandee, 2018). Moreover, considering the lack of relevant studies in Turkey (Kassymova & Çiftçi, 2020), the current study based on the following research questions aims to investigate the CLIL lesson planning process of a group of EFL teachers by delving into their content preferences, perceptions of Coyle et al.'s (2010) 4Cs framework, feelings about receiving feedback about their lesson plans, perceived challenges and solutions in lesson planning as well as the contribution of the process to their professional development and teacher identity as CLIL lesson planners:

1. How did EFL teachers determine the content focus of their CLIL lesson plans?

2. What do EFL teachers think about the 4Cs framework used in the CLIL lesson plan preparation procedure?

3. How do EFL teachers feel about receiving peer feedback related to their CLIL lesson plans?

4. What are the challenges EFL teachers encountered in the CLIL lesson planning process and their ways of overcoming them?

5. To what extent can CLIL lesson planning contribute to EFL teachers' professional development?

6. To what extent can CLIL lesson planning contribute to EFL teachers' identity as CLIL lesson planners?

2 | METHOD

In this qualitative study, participants were engaged in a teacher research defined as a research design in which the teacher inquires into his/her own practices (Richardson, 2001). Within this research design, the study adopts a descriptive case study (Yin, 2003) focusing on the perspectives of a group of English language teachers about CLIL after they voluntarily took part in a CLIL lesson planning procedure following an introduction to different aspects of CLIL in an MA course.

PARTICIPANTS AND CONTEXT

Participants were five volunteer English language teachers enrolled in the MA program of an ELT department at a state university in Turkey. All of them had completed major ELT courses dealing with issues such as the curriculum and materials design. The teachers were female, and their English language teaching experience ranged from young learners to adults and from private schools/language courses to public schools. They also had teaching experience spanning 4-13 years; however, they did not receive any formal education on CLIL.

The MA program in the context of the study aims to provide English language teachers with knowledge related to areas such as conducting academic research and such skills as verbally presenting the findings of a research study. They are also required to write a thesis upon successful completion of MA courses. At the time of the current study, they were taking a fourteen-week MA course with special emphasis on theoretical and practical issues

regarding CLIL. Within the scope of this course, they were provided with the theoretical knowledge prior to this study regarding the definition and scope of CLIL, variations in the CLIL curriculum and the theory behind CLIL as well as with the practical aspects of CLIL (e.g., how to prepare CLIL lesson plans and materials) based on Coyle et al.'s (2010) book. Furthermore, an article by Banegas (2017) elaborating on the teacher-designed CLIL materials was discussed with the teachers.

RESEARCH PROCEDURE

Following the CLIL training, the participating EFL teachers worked toward their lesson plans. Each teacher developed three 80-minute language-driven CLIL lesson plans and accompanying materials. They were given nearly three weeks to prepare each of their lesson plans and materials considering the sample lesson template developed by Coyle et al. (2010) and used by Banegas (2015) in an earlier study. Moreover, feedback was shared among the participants at the end of each lesson planning phase resorting to a peer feedback form adapted from Arshad and Mahmood's (2019) checklist.

Although the participants were randomly paired, one of them volunteered to work with two peers throughout the feedback process as five teachers volunteered to take part in the study. They made necessary revisions in each lesson plan in line with their peer's suggestions (Farrell, 2011). For research purposes, the peer feedback received by the peers were submitted to the researcher together with the CLIL lesson plans and accompanying materials as well as the self-reflections they wrote about their peer's suggestions, their own thoughts about these suggestions, the revisions they made and their own opinions about their lesson plans.

DATA COLLECTION

This study involves two qualitative data collection instruments. Firstly, document analysis was used to identify the content preferences in the participants' lesson plans (n=15). Neither the lesson plans/materials nor the self-reflections were graded during the research procedure to allow the volunteer teachers to be creative and express themselves freely. Secondly, semi-structured interviews were conducted online in English with each of the participating EFL teachers, and each individual interview lasted approximately 35 minutes. The interview questions prepared in accordance with the literature (Ball, 2018; Banegas, 2016; Banegas et al., 2020; Coyle et al., 2010; Izadinia, 2016; Kelchtermans, 1993) mainly focus on the following issues: how participants determined the content focus of their lesson plans, how they felt about Coyle et al.'s (2010) 4Cs framework and about receiving feedback from peers, what kind of difficulties they encountered and the relevant solutions they came up with throughout the lesson planning procedure, and finally how the lesson planning process contributed to their improvement in terms of professional development and teacher identity as CLIL lesson planners.

DATA ANALYSIS

While analyzing the lesson plans, the researcher read through the global goals of the lesson plans and the teaching objectives of 15 lesson plans to identify the content preferences of the participants. In addition, the analysis of the semi-structured interviews conducted and recorded online was based on the relevant representative participant quotations presented in the findings section in italics (Yıldırım & Şimşek, 2013). In cases where more than one participant made a similar comment in response to an interview question, one of the representative comments was presented in the analysis, and while relevant interview quotations fewer than 40 words were given within parentheses in the paragraphs, those including more than 40 words were presented as block quotations (Corden & Sainsbury, 2006). To keep the data anonymous, the documents and interview quotations of the teachers (T) were coded as T1, T2, T3, T4 and T5 throughout the analysis.

3 | FINDINGS

The first research question deals with how the participants determined the content focus of their CLIL lesson plans. In order to ascertain their justifications of content preferences, it is important to firstly present the contents they chose for their lesson plans. As can be realized in Table 1, the chosen contents of 15 lesson plans come from various content areas (e.g., British philosophers, climate and daily life).

Table 1: Content Focus of the Lesson Plans

Content Focus	T1	T2	T3	T4	T5
Lesson 1	British philosophers	Shape and motions of the Earth	Five senses	Jobs in oil and gas industry	Food around the world
Lesson 2	Black holes	Impacts of World War I on humanity	Ecosystems	Describing rooms	Climate and daily life
Lesson 3	Literature	Post-impressionism and van Gogh	Literary devices and story elements	Identifying personality through signatures	Animal world

In response to the interview question as to how they decided upon their contents, being familiar with the content was considered by two teachers as the main reason (e.g., T2: "*I thought that it would be fun to create a lesson plan around van Gogh because I know a lot about van Gogh and post-impressionism*."). On the other hand, two teachers stated that they took the culture component into consideration while determining their contents (e.g., T5: "*I tried to write a lesson plan about food. You know that food is cultural, and we can find very different kinds of food around the world*."). Additionally, one of the teachers made the following comment arguing that she wanted to challenge herself with her content choices to improve her self-esteem in terms of content knowledge:

> T1: *My first lesson plan was about major schools of thought in philosophy. The second one was about physics, more specifically about black holes and the last one was about literature. And why did I choose them? Because I wanted to challenge myself as an English language teacher. I wanted to increase my self-esteem in terms of content*.

PERSPECTIVES ABOUT THE 4CS FRAMEWORK

The second research question focuses on teachers' perspectives about Coyle et al.'s (2010) 4Cs framework used in the CLIL lesson plan preparation procedure. This framework and the relevant sample lesson template were followed as a guide to prepare the lesson plans and accompanying materials in this study, and the perspectives about the framework were found to be positive in general. Some of the positive key words that were associated with the framework by the teachers are as follows: concise and organized (n=2) (e.g., T2: "*I found it very concise and very organized in achieving the aims because I believe that everything was stated clearly in that*.") as well as detailed as can be realized from the following comment:

> T5: *The 4Cs framework is really detailed. You can also see your aims and goals in a detailed way. It helped me a lot. For example, while I was preparing a lesson plan, I may not have realized some specific goals. But when I tried to write them down, I realized what my aims were*.

Other positive words related to the 4Cs framework are as follows: useful (T4: "*The template helps a lot. It is useful*.") and specific (T1: "*It is very specific when it comes to objectives delineation*."). Still, one of the teachers pointed out that students' background knowledge was not emphasized in the lesson template, and thus made the following suggestion:

> T1: *In the lesson plan, we do not have students' background knowledge or what they already know. So, such specifications should be inserted into this CLIL lesson plan because I really felt like I am not giving enough information about the target group while using this lesson plan template*.

PERSPECTIVES ABOUT RECEIVING PEER FEEDBACK

The third research question delves into the perspectives of the teachers pertaining to receiving peer feedback about their CLIL lesson plans. The 4Cs framework was applied in this study in a way that all the teachers shared feedback related to their lesson plans. In reaction to receiving feedback, all the teachers appreciated its value by expressing the benefits of peer feedback in the process of CLIL lesson plan development, such as realizing the strengths and weaknesses of the lesson plan thanks to an outsider perspective (n=3) (e.g., T2: "*We need an outsider perspective to correct our mistakes or improve ourselves. For this process, I found this very beneficial because it helped me see my weaknesses and my strengths, which is motivating*.") and paving the way for reflective thinking

(n=2) (e.g., T1: "*It is very helpful for a teacher to reflect on his/her practices while getting feedback and after revising the lesson plan and then to write a reflection form. I think this is a wonderful and brilliant idea*.").

In relation to the feedback procedure, teachers were also asked to comment on their peers by producing metaphors to describe them. As can be observed from such metaphors as "*encouraging friend*" (T1), "*mentor*" (T2), "*magnifying glass*" (T3), "*a safeguard*" (T4) and "*mirror*" (T5), the peers were perceived positively as well.

CHALLENGES IN CLIL LESSON PLANNING

As for the fourth research question examining the challenges teachers encountered in the CLIL lesson planning process and their ways of dealing with these problems, they mentioned the following difficulties: integrating the cultural aspect into the lesson plan (T2: "*The first lesson plan was shape and motions of the Earth. It was very challenging for me to consider adding cultural aspects of the content*."), finding relevant materials (T5: "*To find some materials can be sometimes difficult because of the topics I chose*."), the extensive amount of time required to prepare CLIL materials (T1: "*One cannot simply develop CLIL materials out of the blue. It takes too much time*."), choosing appropriate reading texts (T3: "*Choosing the suitable reading text was very difficult because I needed to go over the content in the text by myself and then created activities*.") and searching a long time for topic selection (T4: "*The primary challenge was choosing the topic for the lessons. I was hesitant if this topic was appropriate for CLIL or not. I had to search a lot for topic selection*.").

Furthermore, as a means of overcoming the aforementioned challenges, the following ways were mentioned by the teachers: resorting to the Internet (n=2) (e.g., T2: "*While looking at some ideas on the Internet in terms of what I can teach related to the shape and motions of the Earth, I saw some examples in which seasons were taught within this content in some materials*."), readily available materials (T1: "*In my first lesson plan, I heavily depended on the readily-made materials because I didn't know what to do*."), sample lesson plans (T3: "*I tried to look up sample lesson plans*.") and peer and self-reflections as can be understood from the following comment:

> T5: *My peers' reflections helped me a lot. I tried to focus more on the challenges I encountered. I also checked with my inner thoughts. I mean I asked myself some questions, such as where I could use it, where I could put this material in my lesson plan and in what ways it would be useful*.

EFL TEACHERS' PROFESSIONAL DEVELOPMENT

Related to the fifth research question exploring the extent to which CLIL lesson planning can contribute to EFL teachers' professional development, the participating teachers were firstly asked to comment on their perceived improvement from the first to the last CLIL lesson plans. It can be realized from the participants' statements that the teachers themselves and their peers evaluated their improvement in their last lesson plans positively in terms of two major issues: the visual attractiveness of the content (n=3) (e.g., T2: "*The visual attractiveness of the content I created has improved a lot since the first lesson plan*") and incorporating more intercultural elements as well as pair/group work activities (n=2) as can be seen in the following comment:

> T3: *The first lesson plan was kind of a draft for me. Based on my peer's comment, I increased the number of pair work and group work activities. Also, my integration of intercultural elements was very limited in the first lesson plan. But when it comes to the third lesson plan, I tried to include more intercultural elements and more pair work and group work activities*.

Secondly, their perceptions of CLIL improved as a result of their engagement in the CLIL lesson planning process. The majority of teachers (n=4) indicated that although they had held some negative attitudes towards the application of CLIL into the Turkish EFL context before they took part in this study, they were convinced that it is applicable into English language classes in Turkey. One of the representative comments is as follows:

> T1: *I used to believe that CLIL has some sort of elitism which means that only the ones in private schools for example, are able to reach CLIL courses or CLIL teachers. However, after I attended this lesson planning project, my fixed and implicit mindsets about CLIL and my prejudices about CLIL turned into something which is one hundred percent positive. This process made me aware of the fact that CLIL can be facilitated for many groups of learners*.

Conversely, as can be understood from the following statement, one of the teachers expressed negative perceptions of CLIL by pointing out that during the CLIL lesson planning stage, she became aware of the difficulty of writing a CLIL lesson plan because of the expertise it necessitates, and she thought that it is hard to incorporate CLIL into her classes due to the linguistic difficulty of CLIL lessons:

> T3: *At first, I was very positive about CLIL, but over time when writing the lesson plans, I realized that it is difficult to write the lesson plan as it requires expertise, and it is difficult to apply a CLIL lesson plan in my context. The language needed for a CLIL lesson is higher than a simple EFL lesson*.

Another improvement area that was under investigation was the linguistic improvement of the teachers. The participants believed that their involvement in the study somehow contributed to the following language skills: contextualized and terminological vocabulary knowledge (n=3) (e.g., T3: "*Vocabulary development was very significant for me because I may not know the subject-specific knowledge based on topics like ecosystem. When designing the lesson, I went through some terms*.") and writing (n=2) (e.g., T2: "*I can say that it contributed in a micro way to my organizational writing skills, how to organize a text and content*.").

On the other hand, as far as their content knowledge improvement is concerned, there was unanimous agreement among the teachers that they gained knowledge about various content areas on which they designed their lesson plans. They exemplified the improvement of their content knowledge by mentioning the following content areas: the effects of World War I on humanity (T2: "*Especially my second CLIL lesson plan in which I prepared a content regarding the impacts of World War I on humanity helped me learn about some different aspects of the war*."), vertebrates/invertebrates (T5: "*I didn't know what vertebrates and invertebrates meant, but later when I focused on animals in my lesson plan, I learnt what they were*."), the subcategories of ecosystem (T3: "*Before designing my second lesson plan, I knew what ecosystem was, but I didn't know the subcategories of ecosystem*."), the sector of oil and industry (T4: "*I had never known about the sector of oil and industry*.") and deus ex machina/iambic pentameter (T1: "*I didn't know anything about deus ex machina which is a literary device, and I have never heard iambic pentameter before. While I was creating my lesson plan about literature, I searched and learned a lot about them*.").

Finally, the improvement in their CLIL material development skills was agreed upon by the teachers at the end of the study. They commented on the following skills: designing an organized lesson plan (n=2) (e.g., T2: "*To be honest, I haven't done anything like this before, so I didn't have any chance to create such an organized lesson plan. I can say that the biggest contribution has been to my materials development*."), including more discussion activities and visuals (n=2) (e.g., T3: "*When creating CLIL lesson plans, I tried to do more discussion activities. I also used more visuals in my CLIL lesson plans*.") and incorporating technology (T4: "*I learned how to give a shape to my materials and gained better use of technology in this process*."). A further comment was made by one of the participants to underline that her dependence on readily available materials decreased from the first to the third CLIL lesson plan:

> T1: *Especially in my first CLIL lesson plan, I heavily depended on a material that I found on the Internet. In my second CLIL lesson plan, my heavy reliance and dependence on readily made CLIL materials decreased. I was the one who prepared most of the activities. For the last one, I actually didn't need any readily made CLIL lesson plans or textbooks. I looked for authentic materials and designed almost all of the activities*.

EFL TEACHERS' IDENTITY

The last research question aiming to ascertain the extent to which CLIL lesson planning can contribute to EFL teachers' identity as CLIL lesson planners was approached below considering the following three components of teacher identity (Kelchtermans, 1993): self-image (i.e., how oneself is described), self-efficacy (i.e., how weaknesses and strengths are evaluated) and task perception (i.e., how the main responsibilities are perceived).

The teachers were firstly asked how much they had known about CLIL before participating in this study, and all of them indicated that they had no formal education on CLIL (e.g., T4: "*I didn't know anything before taking the course*."). Therefore, they were asked to reflect on their self-image formed as a result of their participation in the study, and they evaluated themselves as CLIL lesson planners. Most of the participants (n=4) described themselves as somewhere in the middle (e.g., T3: "*I may not say I became an expert in that subject, but I improved*

myself a lot. I am in the middle, not inexperienced and not an expert."). Whereas only one participant claimed that she is in a "very good position" as the comment below illustrates:

> T1: *I see myself in a very good position. I have seen myself in the eyes of other people thanks to the peer feedback. They said that I am able to create a very excellent lesson plan referring to my third lesson plan. I gained teacher self-confidence and self-esteem*.

With respect to self-efficacy, it was found that all the participants reported some strengths and weaknesses regarding the lesson planning procedure. The strengths they mentioned were using visuals (T2: "*My strength was to use some visuals very effectively*."), preparing detailed lesson plans (T5: "*As far as I understand from my peer's comments, I am good at preparing detailed lesson plans. I try to focus on different points*."), being able to challenge herself by including abstract contents in the lesson plans (T1: "*My first asset is that I wanted to challenge myself with abstract contents like philosophy and physics*."), producing activities (T3: "*Actually, I didn't have any difficulties in coming up with the activities*."), and being able to design coherent lesson plans from simple to difficult and linking activities to the lesson template used in the lesson planning process (T4: "*My strength is the coherence of the stages of my lesson plan from simple to difficult. I also linked the stages correctly to the lesson template*.").

In contrast, the weaknesses expressed by the participants were as follows: the excessive length of time spent to prepare CLIL lesson plans (T2: "*My weakness is that I had huge amount of time preparing my lesson plans because I wanted them to look perfect*."), not being able to determine the level of the texts (T5: "*When I see a text, I cannot easily decide which level it is*."), being too ambitious in content choice (T1: "*From time to time, I may get too ambitious about the topic itself. For example, black hole might not be a good idea for a lesson plan. From now on, I will keep it a little bit safe*."), writing lesson aims and objectives (T3: "*The most challenging part for me is to write the lesson objectives and the aims*.") and feeling indecisive in topic selection and materials development (T4: "*My weakness was being indecisive and hesitant while choosing the topics and also developing the materials*.").

The last component of teacher identity focused in the study is task perception. In reply to the question intended to uncover the main responsibilities of CLIL lesson planners towards students, participants touched upon the following responsibilities: creating materials which scaffold learners (T2: "*One of the responsibilities is to create materials in a way that they will scaffold students in their learning process. Everything has to be clear and understandable*."), enabling students to learn effectively (T5: "*Firstly, we need to help them learn effectively. Our aim isn't to make lesson really difficult for them. Our goal is to motivate them, not to demotivate them*."), raising students' intercultural awareness (T1: "*I perceive myself as a cultural ambassador as a CLIL teacher. When you take a look at my global goals, you will see that I want to increase the intercultural awareness of the students*."), taking the student profile into account (T3: "*We should take the student profile into consideration in our lesson plans. If we don't consider our students' cognitive and linguistic levels in our CLIL lesson plans, our lesson plans will be meaningless*.") and providing students with the correct amount of information (T4: "*My responsibility is to load the students with the correct amount of information*.").

4 | DISCUSSION & CONCLUSION

Considering the lack of CLIL materials designed in accordance with frameworks such as the 4Cs and the benefits of developing lessons/materials for English language teachers' professional development (Ball, 2018; Banegas, 2016; Banegas et al., 2020; Morton, 2013), this study investigated the perceptions of five EFL teachers in Turkey about the language-driven CLIL lesson planning process during which each of them developed three different CLIL lesson plans and accompanying materials.

The analysis of the lesson plans yielded the result that contents including geographical issues such as the shape and motions of the Earth, biological topics such as ecosystem and historical topics such as the World War I were selected by the participants when they were given the flexibility to choose their lesson contents. Also, the analysis of the interview data demonstrated that being familiar with the content was one of the main reasons behind the selection of these lesson contents. Leung (2015) similarly points out that English language teachers have the tendency to select their contents in their CLIL lesson plans depending on their familiarity with the contents.

The current study also uncovered that all the participants expressed their satisfaction with the 4Cs framework and the lesson plan template used in the study. Likewise, Turner (2021) favors the benefits of the 4Cs framework as it is compatible with student-centered and enquiry-based approaches. Moreover, the participating EFL teachers agreed on the advantages of the peer feedback process, and from the metaphors they generated to describe their peers, it was realized that their perceptions of their peers were also positive. This finding concurs with the idea that it is essential for CLIL teachers and materials designers to work cooperatively and support each other by sharing experiences, materials and practices (Banegas, 2016; Coyle et al., 2010; DelliCarpini, 2021).

Among the challenges participants encountered through the CLIL lesson preparation process are incorporating culture into the lesson plan, finding relevant materials and spending a lengthy amount of time. In the same vein, it is reported that the CLIL lesson planning and thus materials development process can be challenging and time-consuming at times (Banegas, 2016; Gierlinger 2007; Moore & Lorenzo, 2007). Carrying out extensive research about the content, choosing appropriate authentic reading texts, searching a long time for topic selection (Pérez & Malagón, 2017) and the lack of CLIL materials are also discussed in the literature as some of the most common challenges of the CLIL lesson preparation process (Ball, 2018; Banegas, 2010, 2013; Catenaccio & Giglioni, 2016). On the other hand, participants' ways of coping with these challenges (e.g., searching the Internet, peer-feedback, using readily available materials) demonstrate that as a result of their engagement in the CLIL lesson planning process, they developed "resilience" which is a term used to refer to the ability or capacity to resist and cope with challenges (Sammons et al., 2007).

Another focus of the study was the perceived improvement of the participants in areas, such as their perception of CLIL, lesson planning, content knowledge and materials development skills. Their perceptions of CLIL were generally found to be positive at the end of the lesson planning procedure. For instance, while one of the participants had considered CLIL as an elitist approach before the study, she favored the implementation of CLIL in the Turkish EFL content at the end of the study. The limited number of CLIL teachers, materials and training opportunities might sometimes evoke CLIL programs to be perceived as elitist, and teachers may become resistant to apply a CLIL approach (Hillyard, 2011; Mehisto et al., 2008); however, positive perceptions about CLIL in different contexts are evidenced in the relevant literature (Dafouz et al., 2007; Infante et al., 2009; Soler et al., 2017).

As far as the improvement in terms of materials design is concerned, participants responded positively as well. Teacher-made CLIL material preparation process is known to have the potential to give teachers awareness about issues such as prioritizing the focus on content rather than the explicit instruction of language rules (Banegas, 2015). On the other hand, pertaining to the content knowledge, all the participants indicated that they learned about contents from a wide range of disciplines ranging from literature (e.g., iambic pentameter) to history (e.g., World War I). This finding overlaps with that of Banegas et al. (2020) who unveiled that the content and linguistic knowledge of the English language teachers improved through their involvement in the CLIL materials design process.

Finally, it was observed that although the participants had no formal education on CLIL before taking part in this study, their identity was positively influenced by the CLIL lesson planning procedure applied herein. Despite the unfamiliarity with CLIL and the vagueness of the concept in teachers' minds (Savic, 2010), it is promising that most of the participating teachers described their self-images as CLIL lesson planners as somewhere in the middle in the end. The contribution of CLIL lesson planning to the professional development and the identity of the English language teachers was similarly highlighted by other studies as well (Banegas, 2020; Banegas et al., 2020).

Considering the positive influence of the CLIL lesson planning process on the improvement of English language teachers in a wide range of areas, it is suggested that CLIL is a valuable asset for in-service teacher education programs (Banegas, 2010, 2016; Banegas et al., 2020). Therefore, it would be fair to recommend that CLIL lesson planning could be an integral part of English teacher education programs, and more specifically, English language teachers should be given the theoretical background of CLIL as in the current study and then encouraged to prepare lesson plans and accompanying materials in line with a framework and a template (e.g., Coyle et al., 2010) in in-service teacher education programs or MA programs in the field of ELT (Banegas, 2017). The integration of content-based teaching into MA TESOL (Teaching English to Speakers of Other Languages) programs is thought to be necessary taking the popularity of such programs in various TESOL contexts into

account (DelliCarpini, 2021; Turner, 2021). As also implemented in the present study, a peer feedback consortium can be established among the EFL teachers to share feedback about CLIL lesson plans and materials because peer feedback is considered useful in the process of teachers' professional development (Farrell, 2011).

As teacher perceptions in this study are based on language-driven CLIL lesson plans and materials that were not unfortunately implemented in the classroom due to time constraints, further studies can delve into both students and teachers' perceptions of CLIL following the implementation of the CLIL lesson plans and materials in the classroom setting. If an opportunity to observe students being exposed to a CLIL approach is provided to the English language teachers, more detailed perceptions could be elicited from them. For future studies, it can also be suggested that the influence of CLIL lesson planning process on pre-service EFL teachers should be investigated.

STATEMENTS OF PUBLICATION ETHICS

Ethics committee approval for the study was received from Bolu Abant İzzet Baysal University Human Research Ethics Committee in Social Sciences.

CONFLICT OF INTEREST

The author of the present article declares that there is no conflict of interest.

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The Effects of Animated Cartoon Series on 5th Grade Students' Environmental Literacy Sub-dimensions: The Case of "SU ELÇİLERİ"

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ABSTRACT

The purpose of this study is to explore the effect of an animated cartoon series on middle school student's sub-dimensions of the environmental literacy. A quasi-experimental pre-post design with a control group is utilized. The sample is 33 volunteer 5th-grade students who attended intact classes. The objectives of the "Human and Environment" unit set the framework of the implementation and distance learning was used in both groups. In the control group, lecturing, interactive activities, and questioning was used during 5 weeks of the implementation. In the experimental group, the content and the activities are the same as the control group except watching animated cartoons. Episodes of the "Su Elçileri" series matched with the content and objectives of the unit were watched with the sequence of the objectives of the unit. It is ensured that the students realized the environmental problem discussed in each episode and think like the characters in the animated cartoon series. Research data were collected using Environmental Knowledge Test, Affective Dispositions towards the Environment Scale, Environmentally Responsible Behavior Scale, and Environmental Problems Attitude Scale. The findings indicate that exposure to the "Su Elçileri" animated cartoon series results in significantly better improvement in environmentally responsible behaviors and the attitude toward environmental problems than the control group. The findings draw attention to animated cartoons as a teaching strategy in environmental education and science education, especially in younger age groups.

Keywords: Environmental Literacy, Animated Cartoons, Environmental Education, Science Education

Çizgi Filmlerin 5. Sınıf Öğrencilerinin Çevre Okuryazarlığı Alt-boyutları Üzerine Etkileri: Su Elçileri Örneği

ÖZ

Bu çalışmanın amacı çizgi filmlerin ortaokul öğrencilerinin çevre okuryazarlığı alt boyutları üzerine olan etkilerini incelemektir. Çalışmada ön-test son-test kontrol gruplu yarı deneysel desen kullanılmıştır. Örneklem birbirine benzer özelliklere sahip sınıflarda öğrenim gören 33 gönüllü 5. sınıf öğrencisinden oluşmaktadır. Uygulama "İnsan ve Çevre" ünitesi kazanımları çerçevesinde her iki grupta da uzaktan eğitim olarak yapılmıştır. Kontrol grubunda 5 hafta boyunca, etkileşimli etkinlikler ve soru sorma ile desteklenen geleneksel ders anlatımı yapılırken, deney grubunda bunlara ek olarak çizgi filmler izlenmiştir. Ünite kazanımları ile eşleştirilmiş "Su Elçileri" çizgi filminin bölümleri kazanımların sırasına uygun olarak izlenmiştir. Öğrencilerin her bölümde ele alınan çevre probleminin farkına varmaları ve çizgi filmde yer alan karakterler gibi düşünmeleri sağlanmıştır. Verilerin toplanmasında Çevre Bilgi Testi, Çevreye Yönelik Duyuşsal Eğilimler Ölçeği, Çevreye Yönelik Sorumlu Davranış Ölçeği ve Çevre Problemleri Tutum Testi kullanılarak toplanmıştır. Bulgular "Su Elçileri" çizgi filminin bölümlerini izleyen öğrencilerin kontrol grubu öğrencilerine göre çevreye yönelik sorumlu davranışlarında ve çevre problemlerine yönelik tutumlarında anlamlı gelişme olduğunu göstermektedir. Bu bulgular özellikle küçük yaş grupları için çevre eğitiminde çizgi filmlerin bir strateji olarak kullanılmasına dikkat çekmektedir.

Anahtar kelimeler: Çevre Okuryazarlığı, Çizgi film, Çevre Eğitimi, Fen Eğitimi

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1 | INTRODUCTION

Knowing the elements and understanding how works the environment we live in is important to protect the living organisms and non-living things as a part of this environment and offer solutions to environmental problems. One of the most important objectives among the secondary school science course objectives is to raise scientifically literate individuals. Being aware of the problems experienced in their environment, being knowledgeable about these problems and producing solutions using their scientific process skills, discovering nature, understanding the relationship between humans and the environment, creating sustainable environmental awareness by preventing the damage caused by people to the environment are among the targeted behaviors of scientifically literate individuals. (MoNE, 2018).

The environmental literacy is the whole of habits that include knowledge, skills, attitudes, and behaviors of individuals on environmental issues (Roth, 2002). Environmentally literate individuals are expected to have environmental knowledge, to be aware of environmental problems, and to develop positive attitudes and behaviors towards these problems. This set of behaviors helps people maintain stronger and healthier relationships with nature and other people. The aim of the environmental literacy is to understand the events that take place in the environment we live in, to understand the positive or negative effects of people on these events, and to minimize the damage to nature (Roth, 2002). Knowledge, attitude, and behaviors are common dimensions of the environmental literacy defined in most of the studies (e.g. Hungerford & Volk, 1990; Negev et al., 2008; Pe'er, Goldman & Yavetz, 2007). In addition to these dimensions, affective dispositions towards the environment included affective reactions towards environmental problems and deterioration was also concerned (Erdogan, 2009; Roth, 1992; Teksoz, Sahin ve Ertepinar, 2010). Affective dispositions towards the environment is a broad term and "plays a crucial role in development of environmental responsibilities of individuals" (Fettahlioglu et al., 2016, p. 3182).

The most effective way to improve the environmental literacy of the society is to educate individuals on environmental issues. Among the objectives of environmental education are to have knowledge about the environment and environmental problems, to hold a positive attitude towards the environment, to develop the necessary skills and approaches for environmental protection, and to actively participate in the solution of problems (Ileri, 1998). The personality traits of individuals are formed at an early age of life and the knowledge, skills, behavior, and value judgments gained at these ages are more permanent and sustainable for individuals (Susar-Kirmizi, 2014), the environmental education given to individuals at early ages will be effective in terms of behavior change which is the most intended outcomes of the environmental education. Therefore, the children at younger ages should be the groups that need to be informed and sensitized the most about the environment. According to Erol (2005), environmental education is a need of the young persons because although the young generation is not responsible for the environmental problems they live in, they are individuals who will be personally affected by these problems and who will be effective in solving problems with their behaviors. Environmental education to be given to individuals forming the society from a very young age is also important in terms of preventing some new problems before they occur (Sontay, Gokdere, & Usta, 2015).

Today, technology is used to a great extent to provide individuals various skills, values, attitudes, and behaviors. Among the different technological tools for education, radio, and television programs (animated cartoons, animated films, interviews, competition programs, discussion programs, etc.), computers and computer programs (presentation tools, calculation programs, statistical programs, etc.), simulators and the Internet can be counted (Arici & Dalkilic, 2006). Due to the widespread use of television among these technological tools, it is a mass communication tool for children since they can interact with it at very early ages. Television serves as a tool for the individual to obtain information about the outside world and to get to know the outside world (Yagli, 2013). Some studies show that television cartoon series are among the programs most preferred by children to watch on television (BEBKA, 2018; RTUK, 2018). Therefore, enriching the content of the animated cartoons and developing them in terms of science subjects and objectives will be effective on children's behaviors.

Animated cartoons and animated films attract the attention of children with their visuals and include both entertaining and educating elements. Research studies show that animated cartoons make the teaching process

more enjoyable, contribute to the increase in the desire to learn while supporting the imagination of children (Asci, 2006). Through the relationship with the visual content and movie that form the structure of animated cartoons make them effective and useful tools in the field of education alongside other education tools with the features such as simplifying events and making them easy to understand, dividing them into time zones by creating images (Can, 1996). Considering that children learn many concrete or abstract concepts through animated cartoons, an animated cartoon with a well-prepared content contributes significantly to children's cognitive development (Dalacosta, et al., 2009) and their social and emotional development (Tatli, 2017). It is known that individuals in early childhood show behaviors to believe that the imaginary heroes, places, and events in the animated cartoons are real, to use the words or expressions they hear in these cartoons in their daily life, to identify with the heroes of these cartoons and repeat their actions (Ozdemir & Ramazan, 2012). According to Eskandari (2007), 91% of boys and 80% of girls see heroes of animated cartoons as role models, and most parents say that these cartoons affect their children's lifestyles. Therefore, it is possible to state that animated cartoons can be effective on children's behavior.

There are many studies in the related literature exploring the effects of animated cartoons on children. The effects of Turkish-made television cartoons on children's development and communication (Can, 1995), determination of gender roles (Ergen Kilci, 2009), consumer behaviors (Asçi, 2006), violence tendencies (Issever, 2008), aggression behaviors (Ulken, 2011; Yasar & Paksoy, 2011), listening and speaking skills (Od, 2013), concept teaching (Coskun & Koroglu, 2016), understanding the subject content (Scanlan, 2000) relationship with museum education (Arikan, 2014), and cultural heritage (Tas Alicenap, 2015) were studied. In addition, there are studies investigating the effects of the use of cartoons in education on science teaching (Abdusselam, 2013), social studies teaching (Teymuroglu & Oruc, 2016), and academic achievement and attitudes towards English course (Bulbul & Oruc, 2019). Even there are some studies on animated cartoons and environmental education (Stibbe, 2008; Toledo, et al., 2014), as far as we know no practical study is present on the effect of cartoons on children's environmental literacy.

During the behavior development period of children, they may tend to imitate the behaviors of the characters they watch, like, and interest in animated cartoons (Astuti, Waluyo, & Rohmadi, 2019). Presenting environmental education issues through cartoons may be beneficial for these children to become aware of environmental problems and develop nature-friendly behaviors by creating sensitivity about other living things than humans in nature. Thus, this study focuses on the effect of animated cartoon on students' sub-dimensions of the environmental literacy, for that purpose the "Su Elçileri" animated cartoon series in the "TRT Çocuk" channel was used.

The main research motivation that drives this study is to investigate the effect of "Su Elçileri" short films on the environmental literacy of 5th-grade middle school students. The environmental literacy has four dimensions (Erdogan, 2009; Roth, 1992; Wang, 2014) and the effect of animated cartoons on these sub-dimensions of the environmental literacy (knowledge, affective dispositions, attitude, and behavior) should be investigated. The sub-questions of the study are: What is the effect of the "Su Elçileri" cartoon series on (1) the environmental knowledge (2) the affective disposition towards the environment (3) the environmentally responsible behavior, and (4) the attitudes towards the environmental problems of middle school students?

2 | METHOD

DESIGN OF THE STUDY

In this study, a quasi-experimental design with a pre-test post-test control group was used. In case of impossibility of unbiased assignment for the selection of the study group, a quasi-experimental design is used to determine the experimental and control groups among the ones with close success levels. (Buyukozturk et al., 2014). Intact classes were randomly assigned to the experimental and control groups. The scales used to collect data on the sub-dimensions of the environmental literacy were applied before and after the 5-weeks implementation.

THE SAMPLE

This study was conducted with 5th grade students during the distance education carried out due to the COVID-19 pandemic in the spring semester of the 2020-2021 academic year.

Table 1. Gender Distribution of The Sample

Group	Female	Male	N
EG	9	7	16
CG	11	6	17

Note. EG is the experimental and CG is the control group

The participants are students in a public middle school which is in a city center in the western Black Sea region of Turkey. There are 33 students in total, 16 in the experimental group and 17 in the control group. The students have similar achievement levels. They are 11-12 years old. Most of them are middle-income students. They had at least one of the necessary equipment for distance education such as laptop, smart cell phone, or tablet. Because participation in the courses in distance education is not compulsory, the number of students decreased towards the end of the implementation. The numbers given in Table 1 represent the students who fully participated in the entire implementation process and tests.

SU ELÇILERI (WATER AMBASSADORS)

In this cartoon series, the Ministry of National Education (MONE), the General Directorate of State Hydraulic Works (DSI), and Turkish Radio and Television Corporation (TRT) are the beneficiaries, and the Ministry of Environment and Urbanization is the contracting authority. The TV series prepared within the scope of the "Water Ambassadors Training and Awareness Raising Technical Assistance Project" financed by the European Union and the Republic of Turkey. There are 31 short episodes, and each episode is approximately 10 minutes long.

"Su elçileri" means water ambassadors, and four main characters, Captain Pengu (a penguin), Mandalina (a water buffalo), Misket (a meerkat), and Pelik (a pelican) are the members of the 'Water Ambassadors'. The water ambassadors aim to protect nature, deals with the environmental problems and what needs to be done to eliminate these problems.

There is an environmental theme for each episode such as water, environmental protection, environmental problems, environmental pollution, recycling, and protection of natural resources (Ada & Kartal, 2019). All the episodes are free to watch on both the website of the "TRT Çocuk" channel (TRT Çocuk, 2021) and on the official Youtube channel. The subtitles under the "Human and Environment" unit are "Biodiversity", "Human and Environment Relationship" and "Destructive Natural Events". The objectives of each sub-title correspond exactly to the subjects mentioned in the episodes of "Su Elçileri". Before the implementation, each episode was watched and matched (except two episodes) with the objectives of the unit (see Table 2).

Table 2. Objectives of "Human and Environment Unit" and Related "Su Elçileri" Episodes

Objective	Episode number
F.5.6.1.1. Make an inquiry on the importance of biodiversity for natural life. Gives examples of plants and animals that are endangered or in danger of extinction in our country and in the world.	1, 16
F.5.6.1.2. Discuss the factors that threaten biodiversity based on research studies.	4, 12, 19
F.5.6.2.1. Express the importance of interaction between humans and the environment. The negative effects of environmental pollution on people's health are mentioned.	5, 6, 8, 22, 26, 30
F.5.6.2.2. Offer suggestions for the solution of an environmental problem in the immediate surroundings or in our country.	4, 13, 16, 20, 23
F.5.6.2.3. Make inferences about environmental problems that may occur in the future as a result of human activities.	9, 14, 15, 18, 28
F.5.6.2.4. Discusses the benefits and harms of human-environment interaction on examples.	2, 4, 15, 17, 27
F.5.6.3.1. Explain the destructive natural events caused by natural processes. F.5.6.3.2. Express the ways of protection from destructive natural events.	3, 7, 25

TREATMENT

The research was prepared within the framework of the "Human and Environment" unit objectives in the 5th-grade science curriculum. Distance education was used for 5 weeks in both experimental and control groups

because of the COVID-19 pandemic. None of the students have problems that would prevent them from participating in distance education such as internet access or access to electronic devices.

The structure of lesson plans on "Human and Environment" unit in experimental and control groups were summarized in Table 3. In both groups, z book application was used. Z book is defined as the enriched version of the textbooks with multimedia elements without touching the written texts. The secondary school 5th-grade science textbook provided by the Ministry of National Education was followed and the interactive activities in EBA platform were conducted. Lecturing and questioning were the main strategies used throughout the implementation. In the experimental group, at the beginning of each lesson, students get to watch an episode of "Su Elçileri" animated cartoon related to the subject content and objectives of that lesson. After watching an episode of the "Su elçileri" cartoon series during the lesson, questions were asked to the students to help them understand the relationship between the episode and the learning outcomes of the lesson. Particular attention was drawn to the behavior of the characters, and class discussion initiated on why they behaved the way in the episode. The students were asked how they would behave if they were a character in the cartoon, it was tried to make them have empathy for the characters. A total of 29 episodes were watched with the sequence of the objectives of the unit (see Table 2) during the treatment.

Both classes met for 80 minutes per meeting, two times a week. Due to the limited hours of the lesson, at least one of the episodes was shown to the students during the lesson, and the link of the other related episode/s was sent to the students or their families via a messaging mobile application as homework. The student who watched the episode/s of the "Su Elçileri" at home, wrote sentences summarizing the episode that they watched on a mobile app and commented on the behaviors of the characters. At the same time, the teacher created a discussion environment in this mobile app group and ensured the participation of the students.

Table 3. Structure of Lesson Plans on "Human and Environment" Unit

	In class	At home
Experimental group	• Watching an episode of "Su elçileri" • Discussing on behaviors of the characters in "Su Elçileri" • Lecturing with Z book • Conducting interactive activities in the EBA platform	• Watching other related episodes of the objectives. • Summarizing the episode that they watched and commented on the behaviors of the characters via mobile messaging app • Studying unit worksheet • Completing unit evaluation questions
Control group	• Lecturing with Z book • Questioning • Conducting interactive activities in the EBA platform	• Studying unit worksheet • Completing unit evaluation questions

DATA COLLECTION TOOLS

Data on the sub-dimension of the environmental literacy: knowledge, affective dispositions, attitude, and behavior were collected through four tools. These are "Environmental Knowledge Test", "Affective Dispositions towards the Environment Scale", "Environmentally Responsible Behavior Scale", and "Environmental Problems Attitude Scale". Data was collected through an online platform.

ENVIRONMENTAL KNOWLEDGE TEST: This test was prepared by the researchers to measure the environmental knowledge of the students about the subjects in the Human and Environment unit. The items were composed of 30 questions taken from the "Skill-Based Questions" and "Environmental Education Teaching Material" (Ozdemir et al., 2019) prepared by the Ministry of National Education. Opinions of two experts were taken for the content and face validity of the scale. For content validity, experts were asked to fill in the blank table of specifications and prepare an answer key for the scale. In addition, the experts interpreted the intelligibility of the test items. After the revisions, a pilot study was conducted. The sample of the pilot study was 149 middle school students in the 6th and 7th grades. As a result of item analysis, 3 questions were removed since their discrimination index was too low. Cronbach's Alpha value was calculated as 0.91 and its reliability was determined to be high (Buyukozturk, 2011; Crocker & Algina, 1986).

AFFECTIVE DISPOSITIONS TOWARDS ENVIRONMENT SCALE: The scale developed by Erdogan (2009), is a 4-point Likert-type scale consisting of 14 items measuring affective tendencies towards the environment. A minimum of 14 points and a maximum of 56 points can be obtained. The reliability coefficient was calculated as Cronbach alpha .72 for pre-test data and .92 for post-test data. Therefore, the scale is reliable since the Cronbach alpha coefficient was higher than .70 (Pallant, 2013).

ENVIRONMENTALLY RESPONSIBLE BEHAVIOR SCALE**:** The scale consists of 26 behavioral expressions and was developed by Erdogan, (2009). The seven-point Likert scale; never (0 times), 1 time, 2 times, 3 times, 4 times, 5 times to more than five times, was used. However, these responses were categorized under four groups; "never", "1 to 3", "4 to 5" and "more than 5" to analyze. Therefore, the scores range between 26-104 points. The calculated Cronbach alpha coefficients for pre-test and post-tests were .87 and .91 respectively indicate a reliable scale (Pallant, 2013).

ENVIRONMENTAL PROBLEMS ATTITUDE SCALE: The scale was developed by Ozdemir (2016) for middle school students. It is a five-point Likert-type scale consisting of 20 items (11 positives and 9 negative items). The reported reliability was relatively moderate (.64), and it was calculated as .64 for both pre-test and post-test data of the present study.

ANALYSIS OF DATA

Both descriptive and inferential data analyses were conducted via IBM SPSS Statistics 25. First, the assumption of normal distribution was checked, and non-parametric Mann-Whitney U was conducted to compare the scores of the control and experimental groups. The Wilcoxon Signed-Rank tests were used to compare the pre-test and the post-test scores of each group.

3 | FINDINGS

The descriptive statistics of data obtained from the control group and experimental group are presented in Table 4 and Table 5.

Table 4. Descriptive statistics of data obtained from control group

Group	Test	N	Min	Max	Mean	SD	Skewness	Kurtosis
CG	Pre-K	17	4.00	24.00	12.41	5.799	.279	-.693
	Post-K	17	5.00	22.00	13.29	6.322	.031	-1.769
	Pre-AD	17	35.00	55.00	48.94	5.717	-1.355	1.742
	Post-AD	17	21.00	56.00	48.35	8.867	-2.144	5.253
	Pre-ERB	17	42.00	83.00	59.53	12.526	.515	-.553
	Post-ERB	17	26.00	86.00	61.29	13.415	-.801	2.046
	Pre-ATT	17	58.00	88.00	72.18	8.141	.335	-.413
	Post-ATT	17	48.00	84.00	70.94	8.569	-1.074	1.965

Note. Abbreviations: CG= Control Group. K=Knowledge, AD= Affective Dispositions towards the Environment, ERB= Environmental Responsible Behavior, ATT= Environmental Problems Attitude

Table 5. Desciptives of data obtained from experimental group

Group	Test	N	Min	Max	Mean	SD	Skewness	Kurtosis
EG	Pre-K	16	3.00	25.00	14.88	6.781	-.159	-1.171
	Post-K	16	3.00	25.00	16.25	7.638	-.391	-1.457
	Pre-AD	16	43.00	56.00	50.69	3.535	-.222	-.101
	Post-AD	16	33.00	56.00	50.19	6.167	-1.622	3.000
	Pre-ERB	16	45.00	72.00	55.63	7.482	.690	.223
	Post-ERB	16	57.00	90.00	76.06	9.567	-.484	.030
	Pre-ATT	16	57.00	90.00	73.81	8.557	-.618	.554
	Post-ATT	16	68.00	90.00	77.69	6.311	.285	-.686

Note. Abbreviations: EG= Experimental Group, K=Knowledge, AD= Affective Dispositions towards the Environment, ERB= Environmental Responsible Behavior, ATT= Environmental Problems Attitude

Afterward, it was tested whether the pre-test data collected before the treatment were different between the control and experimental groups. For this purpose, the Mann Whitney-U test was performed, and no statistically significant difference was found between experimental and control groups' pre-test scores in any of the sub-dimensions of the environmental literacy. Results were summarized in Table 6, none of the p values is significant. The findings showed that the students' knowledge levels, affective dispositions toward environment, environmentally responsible behaviors, and attitudes towards the environmental problems were not different from each other before the implementation. Therefore, the differences that may arise between the groups after the implementation could be attributed to the effect of the implementation.

Table 6. Comparison of pre-test scores of the groups

Group	Test	N	Mean Rank	U	P
CG	Pre-K	17	15.09	168.500	.241
EG	Pre-K	16	19.03		
CG	Pre-AD	17	15.91	154.500	.500
EG	Pre-AD	16	18.16		
CG	Pre-ERB	17	18.03	118.500	.528
EG	Pre-ERB	16	15.91		
CG	Pre-ATT	17	15.65	154.000	.533
EG	Pre-ATT	16	18.44		

Note. Abbreviations: CG= Control Group, *EG= Experimental Group*. K=Knowledge, AD= Affective Dispositions towards the Environment, ERB= Environmental Responsible Behavior, ATT= Environmental Problems Attitude.

After the implementation, the post-test data of both the experimental and control groups were compared with each other and the difference between the pre-test and post-test data of the groups were investigated. The findings are presented separately for each test below. Environmental knowledge post-test data of experimental and control groups were compared with Mann Whitney U statistics and the findings are given in Table 7.

Table 7. Comparison of post-test scores of the groups

Group	Test	N	Mean Rank	U	P
CG	Post-K	17	14.79	173.500	.176
EG	Post-K	16	19.34		
CG	Post-AD	17	16.44	145.500	.730
EG	Post-AD	16	17.59		
CG	Post-ERB	17	11.26	233.500	.000*
EG	Post-ERB	16	23.09		
CG	Post-ATT	17	13.71	198.500	.023*
EG	Post-ATT	16	20.50		

Note. Abbreviations: CG= Control Group, *EG= Experimental Group*. K=Knowledge, AD= Affective Dispositions towards the Environment, ERB= Environmental Responsible Behavior, ATT= Environmental Problems Attitude.

After 5 weeks of treatment, there is no statistical difference between experimental (Mean Rank=19.34) and control group students' (Mean Rank=14.79) knowledge on the concepts of the "Human and Environment" unit, U=173.500, z= 1.354, p>.05, r=0.24 (small effect size). There is improvement in the knowledge acquisition of both groups when compared to the pre-K scores of the groups (see Table 4-5). The pre-K mean score of the control

group is $\overline{X}$=12.41, the post-K score is $\overline{X}$= 13.29, and the experimental group's pre-K score is $\overline{X}$=14.88, post-K mean score is $\overline{X}$=16.25. Even there is a mathematical difference between the post-K scores of the groups, the difference is not statistically significant (see Table 7). The question of whether there is a difference between pre-K and post-K scores of each group was investigated with Wilcoxon signed-rank test (see Table 8). The findings show that there is no statistical difference between pre-K and post-K scores of the control group (Z=.833, p>.05, r=0.10 small effect size) as well as the experimental group (Z=.830, p>.05, r=0.10 small effect size).

Table 8. Comparison of pre-K and post-K scores of each group.

Group	Posttest-Pretest	n	Mean Rank	Sum of Ranks	Z	P
CG	Negative differences	6	9.83	59.00	.833	.405
	Positive differences	11	8.55	94.00		
	Ties	0				
EG	Negative differences	7	6.50	45.50	.830	.406
	Positive differences	8	9.31	74.50		
	Ties	1				

Mann- Whitney U statistic was calculated to investigate the effect of animated cartoons on students' affective dispositions towards the environment (see Table 7). The findings indicate that there is no statistical difference between the control group and experimental groups' affective dispositions towards the environment post-AD U=145.500, z=.345, p>.05, r=0.06 (small effect size). The mean rank value of the control group is 16.44 and the experimental group is 17.59. The difference between each group's pre-AD and post-AD affective dispositions towards environment scores was compared with Wilcoxon signed-rank test. Table 9 shows the results of the analysis.

Table 9. Comparison of pre-AD and post-AD scores of each group.

Group	Posttest-Pretest	n	Mean Rank	Sum of Ranks	Z	P
CG	Negative differences	8	7.13	57.00	-.284	.777
	Positive differences	6	8.00	48.00		
	Ties	3				
EG	Negative differences	7	8.21	57.50	-.315	.753
	Positive differences	7	6.79	47.50		
	Ties	2				

The findings show that there is no statistically difference between pre-AD and post-AD scores of the control group (Z=-.284, p>.05, r=0.04 small effect size) and pre-AD and post-AD scores of the experimental group (Z=-.315, p>.05, r=0.04 small effect size) too.

The environmentally responsible behaviors of students are another dependent variable of the study. Mann-Whitney U statistics were calculated to answer the question, whether students' environmentally responsible behaviors of control and experimental group students differ after 5 weeks implementation. The results were given in Table 7. The findings show that there is a statistically significant difference between control and experimental groups' post-ERB scores (U=233.500, z=3.518 p<.05, r=0.61 (large effect size). The difference is in favor of the experimental group (Mean rank= 23.09) than the control group (Mean rank= 11.26). In addition, the difference between pre-ERB and post-ERB data of the control group and experimental group was statistically tested. Wilcoxon signed-rank results are in Table 10. The results show that there is no difference between pre-ERB and post-ERB test scores of the control group (Z=.592, p>.05, r=0.07 small effect size). However, the test was significant for the experimental group that means there is a statistically significant difference between pre and post-test scores of the students who are treated with "Su Elçileri" animated cartoon series (Z=3.520, p<.05, r=0.43 medium effect size). The post-ERB mean score is $\bar{X}$= 76.06 and the pre-ERB mean score is $\bar{X}$= 55.62.

Table 10. Comparison of pre-ERB and post-ERB scores of each group.

Group	Posttest-Pretest	n	Mean Rank	Sum of Ranks	Z	P
CG	Negative differences	7	9.14	64.00	.592	.554
	Positive differences	10	8.90	89.00		
	Ties	0				
EG	Negative differences	0	.00	.00	3.520	.000*
	Positive differences	16	8.50	136.00		
	Ties	0				

Last, the effect of animated cartoon series on students' attitude on environmental problems was tested. The results of the Mann-Whitney U test are presented in Table 6. The findings indicate that there is a statistical difference between the control group and the experimental groups' attitudes towards environmental problems (U=198.500, z=-2.255, p<.05, r=4 medium effect size). The difference is in favor of the experimental group, the mean rank value of the experimental group is 20.91 and the control group is 13.32. The mean post-ATT score of the experimental group is $\bar{X}$= 77.69, and the control group is $\bar{X}$= 70.94. In addition, the difference between pre-ATT and post-ATT scores of the groups were tested with Wilcoxon Signed Rank Test (see Table 11). There is a statistically significant difference between experimental groups' pre-ATT and post-ATT scores (Z=-1.991, p<.05, r=0.25 small effect size).

Table 11. Comparison of pre-ATT and post-ATT scores of each group.

Group	Posttest-Pretest	n	Mean Rank	Sum of Ranks	Z	P
CG	Negative differences	8	8.00	64.00	-.228	.820
	Positive differences	7	8.00	56.00		
	Ties	2				
EG	Negative differences	3	8.33	25.00	-1.991	.047
	Positive differences	12	7.92	95.00		
	Ties	1				

4 | DISCUSSION & CONCLUSION

The present study delves into whether 5th graders' environmental literacy improved by animated cartoons. For this purpose, 5 weeks intervention was conducted in a distance learning environment because of the restrictions during the COVID-19 pandemic. The findings indicate that among four sub-dimensions of the environmental literacy, environmentally responsible behavior and attitude toward environmental problems were improved better in experimental group students than control group students. No statistical difference was detected in the acquisition of knowledge and affective dispositions of the students.

The knowledge gain score of both group students was small, the main reason for the low acquisition of knowledge may be the distance learning environment because of the COVID-19 pandemic. Interaction with the educational material is among the effective ways in online learning, the implementation of the present study includes interactive activities however the students' motivation to learn was low both because of the restrictions to control the spread of coronavirus and midterm and final exams were canceled in schools. The findings emphasize that "such an online education would never replace the need for live education" (Schneider & Council, 2021, s. 390). However, we realized that the experimental group students were more motivated to attend the online

classes, they enjoyed watching animated cartoons episodes during and after the lessons. Further study might be conducted on the effect of animated cartoons on student's motivation to learn environmental issues.

Especially the world of animals is one of the areas where the creative imagination of the child may rise to the surface. In this context, films that include animal characters have great pedagogical value and may improve a child's sensitivity. From this point of view, watching the "Su Elçileri" episodes may improve students' affective dispositions towards the environment since all four characters of the cartoon were sensitive to the environment and environmental problems. However, the result of the study indicates that there is no difference between control and experimental groups' post-affective dispositions towards environment test scores. The necessity of different experiences and practices to nurture affective dispositions of students is emphasized (Fettahlioglu et al., 2016) but the lack of field trips and outdoor learning activities that provides various experiences related to the environment and local environmental problems to the students in the online learning environment may not support students' affective dispositions enough. The main reason for that finding may be attributed to this fact.

According to Roth (1992), affective strand of the environmental literacy is related to several dimensions such as showing responsibilities towards the environment, intention to take an action and attitude toward environment. Although there is no improvement in affective dispositions towards the environment of the students, the findings showed that receiving instruction supported with animated cartoons significantly foster both environmentally responsible behaviors and attitude towards environmental problems. The most intended outcome of environmental education is to raise individuals who have positive attitudes towards environmental problems and exhibit environmental behaviors to solve these problems for a sustainable future. Therefore, the contribution of the study to the related literature is valuable. In each episode of the "Su Elçileri", a local environmental problem occurs, and animal characters solve this problem, experimental group students not only watch episodes but also discuss the problem, how they could behave if they were one of the animals among water ambassadors. The discourses of the students and teachers may improve their attitudes toward the environment and environmentally responsible behavior. In further studies, these discourses might be studied to focus on how watching animated cartoons improve these variables.

The design of the study had to be changed from face-to-face lessons to online environment because of the restrictions during the COVID-19 pandemic. This change results in some limitations and advantages. As a limitation, the sample size became small, online data collection was difficult because of the age range of the students, and parent cooperation was needed more than face to face schooling. Thus, similar studies may be conducted with a large sample and face to face education environment. "The absence or existence of degrees of literacy can best be determined by observed behavior" (Roth,1992, p. 5) therefore, observations and qualitative data could be collected to support the findings.

During the pandemic, students must stay at home and have been overly exposed to technological devices like TV, tablets, laptops, and cell phones. The content of the TV programs, games, cartoons, and their effects on students' behaviors became more important than ever. Bringing the course achievements and animated cartoons together help the students who were bored at home and during the online lessons be motivated to participate in classes and engage in the activities and discussions. The cartoons and animations in the educational environment enable children to participate in the learning environment with fun and willingness and improves effective learning and retention (Aslan, 2020). Therefore, animated cartoons may be used in science education and different grade levels.

STATEMENTS OF PUBLICATION ETHICS

This study includes human research, the methodology, and data collection tools that should be approved to be ethical. The institutional review board office of a state university approved the method of the study (dated March 30th, 2021). Before the study, students were informed about the study, the right to withdraw. Data obtained from the study, students' names, and the name of the school are guaranteed against sharing in the publications by researchers and parents signed the informed consent. This study started with fifty-two students and continued with thirty-three students who accepted the study.

RESEARCHERS' CONTRIBUTION RATE

The contribution rate of the authors is equal in the manuscript.

CONFLICT OF INTEREST

There is no conflict of interest.

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The Effects of Realistic Mathematics Education on Mathematics Attitudes of Students Studying in Turkey: A Meta-Analysis

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ABSTRACT

In this research, the effects of Realistic Mathematics Education on the mathematics attitudes of students studying in Turkey were investigated through meta-analysis. For this purpose, determined indexes were searched for relevant keywords. As a result of the searching, 22 studies were included in the research according to the predetermined inclusion criteria and their effect sizes were calculated. In the analysis, the statistics programs MetaWin and Comprehensive Meta-Analysis were employed. The effect sizes were calculated using Hedges' g coefficient, with a 95% confidence level. The overall effect size value was calculated as 0.652 with a 0.101 level of standard error using the random effects model. The findings show that Realistic Mathematics Education has a moderately positive effect on the attitudes of students studying in Turkey toward mathematics. The effect sizes calculated with regard to moderator variables -level of education, field of study and implementation period-, revealed no statistically significant differences between the groups. There was a statistically significant difference in sample size between the groups.

Keywords: Attitude, meta-analysis, Realistic Mathematics Education.

Gerçekçi Matematik Eğitiminin Türkiye'de Öğrenim Gören Öğrencilerin Matematik Tutumlarına Etkisi: Bir Meta-Analiz

ÖZ

Bu araştırmada Gerçekçi Matematik Eğitiminin Türkiye'de öğrenim gören öğrencilerin matematik tutumlarına etkisi meta-analiz yoluyla araştırılmıştır. Bu amaçla ilgili anahtar kelimelerle belirlenen indeksler taranmıştır. Tarama sonucunda önceden belirlenmiş dahil etme kriterlerine göre 22 çalışma araştırmaya dahil edilmiş ve etki büyüklükleri hesaplanmıştır. Analizde MetaWin ve Comprehensive Meta-Analysis istatistik programları kullanılmıştır. Etki büyüklükleri hesaplanırken güven düzeyi ise %95 olarak kabul edilmiş ve Hedges's g katsayısı kullanılmıştır. Genel etki büyüklüğü değeri, rastgele etkiler modeli kullanılarak 0.101 standart hata düzeyinde 0.652 olarak hesaplanmıştır. Bulgular, Gerçekçi Matematik Eğitiminin Türkiye'de öğrenim gören öğrencilerin matematiğe yönelik tutumları üzerinde orta düzeyde olumlu bir etkiye sahip olduğunu göstermektedir. Eğitim düzeyi, çalışma alanı ve uygulama süresi gibi moderatör değişkenlere göre hesaplanan etki büyüklükleri bakımından gruplar arasında istatistiksel olarak anlamlı bir farklılık olmadığı, örneklem büyüklüğü bakımından ise gruplar arasında istatistiksel olarak anlamlı bir farklılık olduğu belirlenmiştir.

Anahtar kelimeler: Tutum, meta-analiz, Gerçekçi Matematik Eğitimi.

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1 | INTRODUCTION

Mathematics, which is an important tool to understand the world, has an active role in shaping the future of individuals and societies. Individuals who are successful in mathematics have more opportunities with regard to education, business life and social status (Kilpatrick & Swafford, 2003; National Council of Teachers of Mathematics [NCTM], 2000; Organisation for Economic Co-operation and Development [OECD], 2013). Everyone needs mathematical calculations and analysis in their daily life (Haylock & Thangata, 2007; Kilpatrick et al., 2001). Therefore, it can be stated that all one needs to gain basic mathematical skills to meet their mathematical needs in the natural flow of their lives.

Mathematics is taught at all stages of education, from primary to higher education. NCTM (2000) stated that essential opportunities and support should be provided at schools for all children to understand and learn mathematics in depth. Mathematics, a part of modern life and creative discipline, equips children with powerful tools such as abstract thinking, logical reasoning and problem-solving skills which are necessary to understand life and change the world (Department for Education and Employment [DfEE], 1999). The primary goal of mathematics instruction is to prepare students to deal with the mathematical demands of everyday life, to acquire fundamental numerical knowledge and abilities, and to build mathematical thinking skills that will help them increase their intellectual ability (Haylock & Thangata, 2007). Therefore, individuals need to build mathematics through exploration, reasoning, problem-solving, discussion and practical experiences (Haylock, 2010). Individuals who learn mathematics only as procedures cannot use and apply it to their real lives, except in situations similar to what is taught (Davis et al., 2017). Thus, rather than allowing students to passively absorb information, instruction should be based on their prior knowledge, and teachers should assist students in constructing mathematical knowledge (Carpenter et al., 1999). Teachers should instruct students on how to study mathematics, think mathematically, and discover mathematics on their own (Lappan, 1999). Therefore, it can be stated that teachers should avoid traditional teaching approaches that present a mathematical concept including all procedures for its solution step-by-step (Chapko & Buchko, 2004). Instead, teaching strategies which attract the attention of children, challenge children mathematically, and show that children's mathematical ideas are valued should be used (Lappan, 1999).

REALISTIC MATHEMATICS EDUCATION

The Freudenthal Institute in the Netherlands developed Realistic Mathematics Education (RME) as a reform movement against traditional mathematics education (De Lange 1996; Van den Heuvel-Panhuizen & Wijers, 2005; Van den Heuvel-Panhuizen & Drijvers, 2014). Freudenthal's view of mathematics as a human activity is the cornerstone of the RME (Freudenthal, 1991). According to RME, various and realistic experiences should be a part of the learning process. Students use these experiences to begin developing mathematical ideas, tools, and processes (De Lange 1996; Van den Heuvel-Panhuizen & Wijers 2005; Van den Heuvel-Panhuizen & Drijvers, 2014). RME emphasizes increasing students' mathematical understanding and motivation (Freudenthal, 1991; Gravemeijer, 1994). It includes views on what mathematics is, how it should be taught, and how students learn mathematics (Zulkardi, 2002). Students should be given the opportunities to explore mathematics by organizing mathematical relationships and processes in real-world experiences or experiences that are important to them, and they should not be thought of as passive receivers of mathematical knowledge (Freudenthal, 1991). In this way, under the guidance of the teacher, formal mathematical knowledge can be created from the students' informal knowledge (Treffers, 1991). Learning mathematics means doing mathematics by solving daily life problems (Gravemeijer, 1994). Mathematics is formalized with axioms in its final stage. Axioms should not be the starting point in teaching mathematics. Teaching mathematics should be structured as a guided reinvention process in which students can follow in the footsteps of mathematicians (Freudenthal, 1991).

Previously stated, mathematics is a human activity according to RME, Freudenthal (1991) describes this activity as problem solving, problem searching, and also organizing a topic. He stated that in order to solve the problem, it should be structured according to mathematical patterns, organized according to new ideas in a larger framework or with an axiomatic way. This organizing activity is called mathematization (Gravemeijer, 1994; Treffers, 1991). Freudenthal (1991) stated that mathematization provides students with the opportunity to approach daily life situations mathematically, and therefore is a key process in mathematics teaching. It is aimed to develop knowledge from students' thoughts in the mathematization process, the process should be started by mathematizing

the problems that related to their daily lives (Fauzan, 2002). In this way, students have the opportunities to solve real-life problems using their informal knowledge. This process refers to horizontal mathematization (Treffers, 1991). As students experience similar processes, they acquire more formal knowledge and algorithms. This process also refers to vertical mathematization (Treffers, 1991). Horizontal mathematization, according to Freudenthal, entails going from the real world to the world of symbols, and vertical mathematization entails moving inside the world of symbols (Freudenthal, 1991). De Lange (1987) stated that horizontal mathematization involves transferring the real world situation to a mathematical one. Horizontal mathematization tasks include formulating and visualizing a problem in many ways, as well as exploring relationships and patterns. Vertical mathematization tasks include expressing a connection with a formula, utilizing multiple models and combining models, generating a new mathematical idea, and generalizing (De Lange, 1987). The horizontal and vertical processes of mathematization are inextricably linked, with no clear distinction between them (Freudenthal, 1991). Highlighting only real-life situations can push the vertical math process into the background (Van den Heuvel-Panhuizen & Drijvers, 2014). The long-term learning process in RME is created through horizontal and vertical mathematization procedures. Students build formal mathematics through mathematizing real-life problems (horizontal) and problem-solving procedures (vertical). (Fauzan, 2002).

TEACHING PRINCIPLES OF RME

RME has basic principles although it has a dynamic structure. These principles can be listed as follows (Van den Heuvel-Panhuizen & Wijers 2005; Van den Heuvel-Panhuizen & Drijvers, 2014):

The activity principle points out that students are active participants in the learning process. Students build their own mathematics skills and understanding. Mathematics is a human activity that is best taught via practice.

The reality principle means that mathematics instruction should begin with problems which students can make sense of. While solving these problems, students develop informal solving strategies and have the opportunity to make sense of the mathematical structures they have developed. Teaching begins with rich context problems that require mathematical organization rather than teaching definitions and abstractions. Students can develop mathematical understanding while studying on these problems.

The level principle reflects various levels of learning that students go through while learning mathematics such as creating shortcuts and diagrams, developing informal solving strategies, and learning about the relationships between concepts and strategies. In this process, models are effective in filling the gap between informal and formal mathematics.

The intertwinement principle denotes that mathematical topic areas should not be viewed as separate elements of the curriculum, but rather as a cohesive whole. Mathematics is divided into fields that are inextricably linked, and these fields are taught in tandem.

The interaction principle implies that learning mathematics is both an individual and a social activity. Students' explorations and strategies should be shared with others in class and group discussions, and opportunities to contribute their thoughts and opinions should be provided. As a result, students will be able to get insight into how to develop their strategies and achieve a higher degree of comprehension.

The guidance principle represents the guided reinvention of mathematics. Teachers and the curriculum both play a proactive role in the learning of students. Teachers must provide a learning environment in which students can participate in the construction of mathematics. Mathematical scenarios should also be included in the curriculum so that students can explore mathematics depending on the goals of mathematics education.

The principles described should be taken into account while designing and implementing an RME-based teaching approach (Treffers, 1991).

ATTITUDE TOWARDS MATHEMATICS

Neale (1969, p.632) defined attitude towards mathematics as "a collective measure of liking or disliking mathematics, a tendency to participate in or avoid mathematical activities, a belief that one is good or bad in mathematics, and a belief that mathematics is beneficial or useless". Attitude towards mathematics is one of the factors that affect students' mathematical performance (Lipnevich et al., 2011). It is stated that students who have

a positive attitude towards mathematics are more successful in mathematics (Nicolaidou & Philippou, 2003; Sanchez et al., 2004). According to Ma and Kishor (1997), there is a positive relation between mathematics attitude and mathematics performance, and negative attitudes contribute to worse mathematics performance. Students must have a strong knowledge of fundamental mathematical ideas and a positive attitude toward mathematics study in order to be able to use mathematics successfully in their life and be successful further mathematics (Kilpatrick & Swafford, 2003). Teacher and teaching are two elements that have an effect on students' attitudes towards mathematics (Fraser & Kahle, 2007; Hourigan et al., 2016). Therefore, it can be stated that the teaching approaches offered to students affect students' attitudes towards mathematics.

THE PRESENT RESEARCH

Many studies have investigated at the effect of RME on students' attitudes toward mathematics (e.g. Çilingir & Dinç Artut, 2016; Fauzan, 2002; Hough et al., 2017; Korkmaz & Tutak, 2017; Korkmaz & Korkmaz, 2017; Özkaya & Yetim Karca, 2017; Üzel & Mert Uyangör, 2006; Zakaria & Syamaun, 2017; Zulkardi, 2002). In these studies, the effects of RME with regard to various variables such as student groups at different education levels, different sample sizes, different implementation periods and sub-fields of mathematics were examined. While similar results were obtained in some of these studies conducted independently from each other, different results were obtained in others. Thus, bringing together the mentioned research findings and creating a synthesis will lead the way to draw a conclusion and making generalizations of the results. There is no meta-analysis research assessing the effect of RME on the mathematics attitudes of students studying in Turkey in the literature. Based on this, it is aimed to do a meta-analysis of experimental studies investigating the effects of RME on the mathematics attitudes of students studying in Turkey.

RESEARCH QUESTIONS

The following research questions were intended to be answered for this purpose:

1. What is the overall effect of RME on the mathematics attitudes of students studying in Turkey?
2. How does the overall effect of RME on attitude differ with regard to level of education?
3. How does the overall effect of RME on attitude differ with regard to field of study?
4. How does the overall effect of RME on attitude differ with regard to implementation period?
5. How does the overall effect of RME on attitude differ with regard to sample size?

2 | METHOD

RESEARCH DESIGN

Meta-analysis method was used in the research. With meta-analysis, quantitative data obtained as a result of individual studies on a particular topic are brought together, statistical analysis of these data are made and a general evaluation is reached (Durlak & Lipsey, 1991; Glass, 1976; Lipsey & Wilson, 2001; Sánchez-Meca & Marín-Martínez, 2010). In order to reduce the limitations of individual studies with meta-analysis, all studies on the topic are brought together and the results of these studies are synthesized using statistical tools (Frankel et al., 2012). In this context, overall effect sizes for individual studies are defined and the relationships between these effect sizes are interpreted (Card, 2012). Effect size is a value that reflects the size of the result occurring between the groups in an experimental implementation and the degree of the relationship between two variables (Borenstein et al., 2009; Ellis, 2010). The effect size is used to standardize the evaluation results (Mertens, 2010).

After the problem is determined in the meta-analysis process, the relevant literature is investigated in detail and all possible studies are found. Consistent criteria are developed for the discrimination of the studies reached and these studies are coded according to the determined criteria. The results are interpreted by statistical analysis of the data recorded as a result of coding (Neuman, 2013; Sánchez-Meca & Marín-Martínez, 2010). These steps were followed in the present meta-analysis study.

DATA COLLECTION

The data of this research were collected during July in 2021. The data source is constituted by studies that examined the effects of RME on students' mathematical attitudes in Turkey. In order to reach the studies, "Realistic Mathematics Education, RME" keywords in both Turkish and English were searched on the indexes Web of Science (WoS), Education Resources Information Center (ERIC), Google Academic, TR Index and Council of Higher Education Thesis Center. As a result, a total of 106 scientific studies were reached, including 33 articles and 73 postgraduate theses. It was determined that some of the articles were reproduced from postgraduate theses. For this reason, the related theses were not included in the analysis, instead articles were included. The studies that would be included in the meta-analysis were specified based on the following criteria:

1. The study must be conducted in Turkey and either in Turkish or English.
2. The study must be conducted in 2021 and before.
3. The study must have an experimental research design (experimental and control groups with pretest-posttest).
4. In the study, there must not be a statistically significant difference between the pre-test attitude scores of the experimental and control groups, the groups must be homogeneous with regard to attitude.
5. In the study, information about the validity and reliability of measurement tools that used to measure mathematics attitude must be stated.
6. In study, the experimental groups must be taught with RME and the control groups must be taught with the mathematics program specified in the national curriculum in the relevant year.
7. The study must be open to access in indexes which are WoS, ERIC, Google Academic, TR Index and Council of Higher Education Thesis Center.
8. The study must include statistical values (pretest-posttest attitude scores, standard deviation, sample size, p value, t value, F value) related to the experimental and control groups required for the calculation of the effect size.

Considering the inclusion criteria, 22 studies were included in this meta-analysis. One of these studies used two control groups therefore two separate effect size values were calculated and presented in forest plot with labels a and b next to the year of the studies.

DATA CODING

A coding form that containing the information about the studies was prepared by the researcher taking into consideration inclusion criteria. The information included in the form is: title of the study, year, author, type of the study, education level of the sample, field of the study, implementation period, sample size, arithmetic mean and standard deviation values of the experimental and control groups. Coding was processed by the researcher based on this information. In order to ensure coding reliability, two weeks after the first coding, the researcher recoded using the same form. By comparing the two coding results, it was determined that there was no difference and the analysis phase was started.

Descriptive statistics of the studies included in the meta-analysis are presented in Table 1.

Table 1. Sample Descriptive Statistics of the Studies Included in the Meta-analysis

		Frequency (f)	Percentage (%)
Type of Study	Article	6	27.27%
	Master's Thesis	14	66.64%
	Doctoral Dissertation	2	9.09%
Year of the Study	2007	1	4.54%
	2008	1	4.54%
	2010	1	4.54%
	2011	1	4.54%
	2012	1	4.54%

	2014	2	9.09%
	2015	1	4.54%
	2016	1	4.54%
	2017	4	18.18%
	2018	1	4.54%
	2019	6	27.27%
	2020	2	9.09%
Education Level of the Sample	Primary School	7	31.81%
	Middle School	12	54.54%
	High School	3	13.63%
Sample Size	1-15 participants	1	4.54%
	16-30 participants	14	63.63%
	31-45 participants	5	22.72%
	46-60 participants	2	9.09%
Field of Study	Mathematics	16	72.72%
	Geometry	6	27.27%
Implementation Period	1-5 periods	1	4.54%
	6-10 periods	4	18.18%
	11-15 periods	6	27.27%
	16-20 periods	6	27.27%
	36-40 periods	1	4.54%
	Not specified in periods	4	18.18%
Total		22	100

Table 1 reveals that 6 (27.27%) of the studies are articles, 14 (66.64%) master's theses, and 2 (9.09%) doctoral dissertations. Most of the studies were conducted in 2019 (f=6, 27.27%). With regard to education level, mostly middle school (f=12, 54.54%) and primary school (f=7, 31.81%) were sampled and the sample size was mostly 16-30 participants (f=14, 63.63%). 16 of the studies (72.72%) were related to mathematics, and 6 of them (27.27%) were related to geometry. Four of the studies (18.18%) did not specify the period of implementation.

DATA ANALYSIS AND INTERPRETATION

In meta-analysis, two fundamental approaches to calculating effect sizes are used namely fixed effects model and random effects model (Borenstein et al., 2009; Hunter & Schmidt, 2004). In the fixed effects model, the effect sizes of all studies to be included in the meta-analysis are assumed not to change, and the standard deviations of the studies are assumed to be zero. The random effects model, on the other hand, assumes that the effect sizes of all studies to be included in the meta-analysis differ from study to study, and the standard deviations of the studies are assumed to be different from zero (Ellis, 2010). There are techniques used to decide which model to prefer. One of them looks at the Q statistics, which indicates whether the effect sizes are heterogeneously distributed. The Q statistic tests the null hypothesis, which states that all studies included in the meta-analysis share a common effect size with the chi-square (χ^2) distribution. Thus, if the calculated Q value is smaller than the chi-square critical value according to the significance level (p value) and degrees of freedom (df), the distribution is considered homogeneous, and if it is greater, it is considered heterogeneous (Borenstein et al., 2009). As a result of the Q-statistic, the fixed effects model is preferred when the distribution is homogeneous, and the random effects model is preferred when it is heterogeneous (Ellis, 2010). In addition, Borenstein et al. (2009) recommends to use of random effects model when the studies to be included in the meta-analysis are selected from published literature. In the present research, the studies to be included in the meta-analysis were selected from the published literature, and the Q statistic was considered to determine the model to be employed.

Hedges' g coefficient, which indicates the corrected and standardized mean difference between groups (Borenstein et al., 2009), was used in the calculation of effect sizes, and the confidence level was assumed to be 95% in the analysis. In interpreting the effect sizes, the criteria proposed by Cohen et al. (2007, p. 521), "weak effect between 0-0.20, modest effect between 0.21-0.50, moderate effect between 0.51-1.00, strong effect 1 and above" was used.

MetaWin software was used to examine normal distributions of effect sizes, while Comprehensive Meta-Analysis (CMA) was used for other analysis. In the calculations, via the interfaces provided by CMA, mean (M), standard deviation (SD), sample size (N) values and test statistics values (p value, t value, F value, etc.) of the experimental and control groups were used. As mentioned earlier, level of education, field of study, implementation period and sample size were specified as moderator variables in this study. Funnel plot and Rosenthal's Safe-N statistic (Fail-Safe N-FSN) (Borenstein et al., 2009) were used together in determining the publication bias of the studies to be included in the meta-analysis. In addition, the formula N/(5k+10) (k refers to the number of studies included in the meta-analysis) proposed by Mullen et al. (2001) based on Rosenthal's fail-safe N was used. The value obtained as a result of the calculation according to this formula greater than one indicates that the meta-analysis result is sufficiently resistant to publication bias.

RESEARCH ETHICS

In this research, the data were collected from open access and published studies. Scientific ethics and publication ethics norms were followed at every stage of the research.

3 | FINDINGS

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The normal distribution chart was examined to determine if it was possible to combine the effect sizes of the studies with meta-analysis. Figure 1 shows the normal distribution chart.

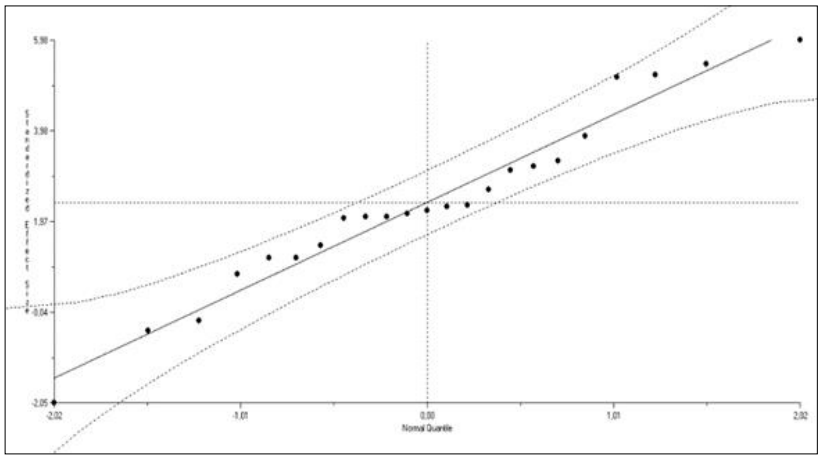

Figure 1. *Normal Distribution Chart*

The effect sizes of the studies included in the meta-analysis were scattered around the normal distribution line and within the confidence range given with dashed lines, as illustrated in Figure 1. On this basis, it can be assumed that the effect sizes are normally distributed and can be statistically combined with the meta-analysis.

The publication bias of the studies included in the meta-analysis was examined using a funnel plot. The funnel plot is shown in Figure 2.

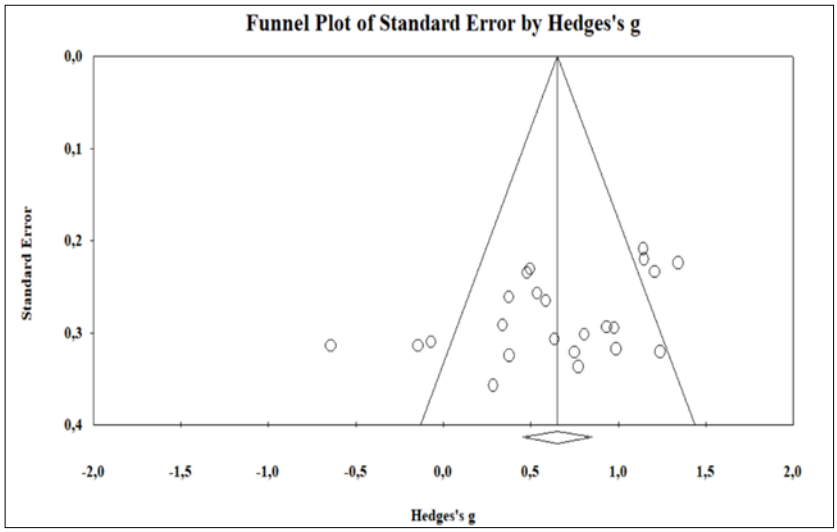

Figure 2. *Funnel Plot of Effect Sizes*

The effect sizes were generally collected in the centre of the funnel plot and scattered asymmetrically on either side of the vertical line indicating the combined effect size, as shown in Figure 2. This finding suggests that the possibility of publication bias exists. Therefore, both Rosenthal's fail-safe N (FSN) formula and Mullen et al.'s N/(5k+10) formula were used to investigate publication bias.

Rosenthal's FSN Results are presented in Table 2.

Table 2. Rosenthal's FSN Results

Bias Level	
Observed studies' Z-value	11.45481
Observed studies' p-value	0.00000
Alpha	0.05
Tails	2
Alpha's Z	1.95996
Observed studies' number	23
FSN	763

The FSN value is calculated as 763 as seen in Table 2. This value indicates the number of studies required for the overall effect size calculated as a result of meta-analysis to be statistically insignificant, with a p value greater than alpha. Furthermore, the value [763/(5*23+10)=6.10>1] resulting from the formula N/(5k+10) suggests that the studies included in the meta-analysis are sufficiently resistant to publication bias.

The statistical results of the studies calculated according to the two approaches are presented in Table 3 to decide which model to use for further calculations.

Table 3. Statistical Findings of Studies Calculated based on the Effect Models

Model	*ES*	%95 CI for *ES*		*SE*	*df*	*Q*	χ^2	*p*
		Lower Limit	Lower Limit					
Fixed	0.699	0.586	0.811	0.057	22	66.225	33.924	0.000
Random	0.652	0.455	0.849	0.101				

According to the fixed effects model, the homogeneity value of the studies included in the meta-analysis is Q=66.225 as shown in Table 3. At the 95% significance level, the chi-square critical value for 22 degrees of freedom is 33.924. The calculated Q value is greater than the chi-square critical value, and the p value is significant (p<.05) indicates that the studies have heterogeneous structure. Based on this, random effects model was used in statistical calculations.

Table 3 shows the findings of the research's first question, "What is the overall effect of RME on the mathematics attitudes of students studying in Turkey?". The overall effect size value was calculated as 0.652 with

a standard error of 0.101 with regard to the random effects model. The calculated effect value is moderate as stated by Cohen et al. (2007). On this basis, it can be concluded that RME has a moderate effect on mathematics attitude. In addition, the positive sign of the effect value shows that RME has a favourable effect on mathematics attitude.

Figure 3 shows a forest plot the distribution of effect size values calculated using the random effects model.

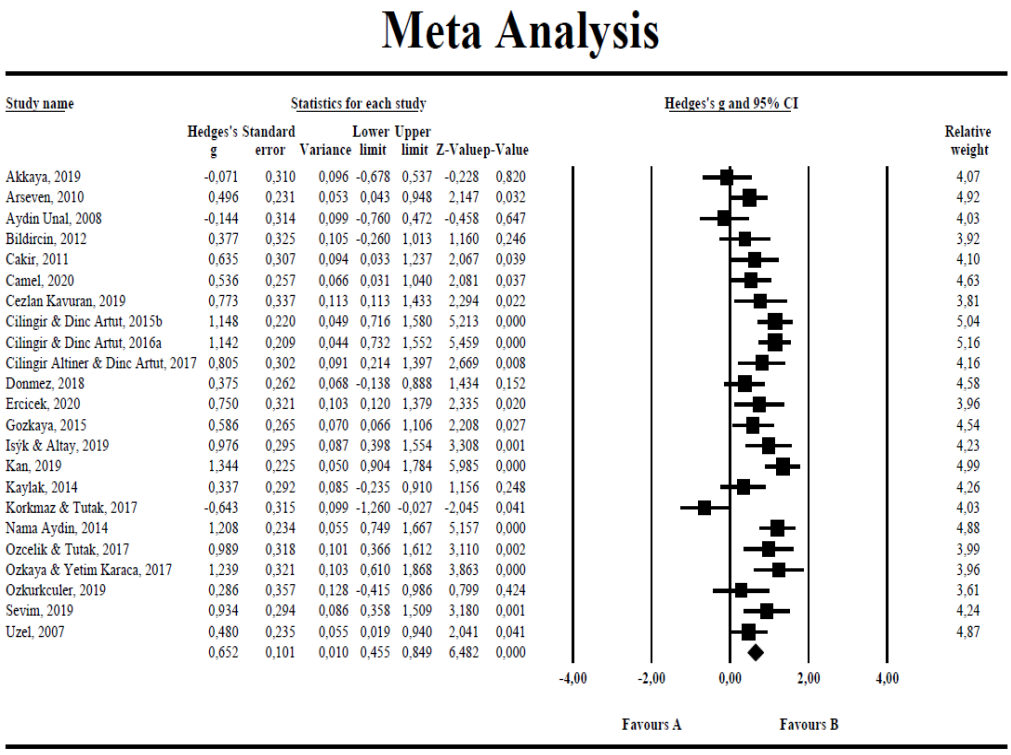

Figure 3. *Forest Plot of the Effect Sizes*

The effect size of each study is represented with the black squares in Figure 3, and the lines on both sides of the squares indicate the upper and lower limits of the calculated effect size in a 95% confidence interval (CI). The area of the squares shows the effect of the related study on the overall effect size. In addition, the rightmost column of the figure contains numerical values for the studies' weight. The calculated overall effect size is represented by the rhombus at the bottom. In accordance with the calculated effect sizes, the smallest effect size is -0.643, while the largest effect size is 1.344. There are 20 positive and three negative effect sizes. Accordingly, in 20 studies, RME has a favourable effect on the experimental group.

Table 4 shows the findings of the research's second question “How does the overall effect of RME on attitude differ with regard to level of education?”.

Table 4. Statistical Findings of Studies Calculated based on the Effect Models

Moderator	Q_B	*p*	*df*	*n*	*ES*	%95 CI for *ES*		*SE*
						Lower Limit	Upper Limit	
Level of Education	4.275	0.118	2					
Primary school				8	0.902	0.630	1.174	0.139
Middle school				12	0.522	0.249	0.795	0.139
High school				3	0.488	-0.074	1.051	0.287

As shown in Table 4, the homogeneity value between the groups calculated with regard to the level of education is Q_B=4.275. At the 95% CI level, the chi-square critical value for 2 degrees of freedom is 5.991. The Q_B value is smaller than the chi-square critical value, and the p value is not significant (p>.05). Thus, it can be stated that RME teaching does not reveal a significant difference in the level of education between the groups.

Table 5 shows the findings of the research's third question "How does the overall effect of RME on attitude differ with regard to field of study?".

Table 5. Effect Sizes Calculated with regard to Field of Study

Moderator	Q_B	*p*	*df*	*n*	*ES*	%95 CI for *ES* Lower Limit	%95 CI for *ES* Upper Limit	*SE*
Field of Study*	0.123	0.726	1					
Mathematics				16	0.676	0.463	0.890	0.109
Geometry				7	0.586	0.129	1.043	0.233

*Mathematics field includes topics such as integers, fractions, algebra, equations and trigonometry. The geometry field includes topics such as geometric shapes and objects, length, area and volume.

The homogeneity value between the groups calculated with regard to the field of study is Q_B=0.123 as shown in Table 5. The chi-square critical value of 1 degrees of freedom at 95% CI level is 3.841. The Q_B value is smaller than the chi-square critical value, and the p value is not significant (p>.05). Thus, it can be stated that RME teaching does not reveal a significant difference in the field of study between the groups.

Table 6 shows the findings of the research's fourth question "How does the overall effect of RME on attitude differ with regard to implementation period?".

Table 6. Effect Sizes Calculated with regard to Implementation Period

Moderator	Q_B	*p*	*df*	*n*	*ES*	%95 CI for *ES* Lower Limit	%95 CI for *ES* Upper Limit	*SE*
Implementation Period*	1.196	0.550	2					
6-10 periods				4	0.734	0.284	1.185	0.230
11-15 periods				6	0.508	0.058	0.957	0.229
16-20 periods				6	0.446	0.190	0.701	0.130

*One period is approximately 40-45 minutes.

The homogeneity value between the groups calculated with regard to the implementation period is Q_B=1.196 as shown in Table 6. The chi-square critical value of 2 degrees of freedom at 95% CI level is 5.991. The Q_B value is smaller than the chi-square critical value, and the p value is not significant (p>.05). Thus, it can be stated that RME teaching does not reveal a significant difference in the implementation period between the groups. It must be stated that five studies which did not define the implementation period and one study determined with an implementation period of 1-5 hours were excluded from the analysis.

Table 7 shows the findings of the research's fifth question "How does the overall effect of RME on attitude differ with regard to sample size?".

Table 7. Effect Sizes Calculated with regard to Sample Size

Moderator	Q_B	*p*	*df*	*n*	*ES*	%95 CI for *ES* Lower Limit	%95 CI for *ES* Upper Limit	*SE*
Sample Size	15.346	0.000	2					
16-30 participants				14	0.523	0.254	0.792	0.137
31-45 participants				5	0.665	0.385	0.946	0.143
46-60 participants				3	1.207	0.961	1.454	0.126

The homogeneity value between the groups calculated with regard to sample size is Q_B=15.346 as shown in Table 7. The chi-square critical value of 2 degrees of freedom at 95% CI level is 5.991. The Q_B value is greater than the chi-square critical value, and the p value is significant (p<.05). Thus, it can be stated that RME teaching reveal a significant difference in the sample size between the groups. As a result, it can be concluded that RME is

more successful in groups with a sample size of 46-60 participants. It must be stated that only one study was determined to have 1-15 participants as the sample size and it was excluded from the analysis.

4 | DISCUSSION & CONCLUSION

In this research, the effects of Realistic Mathematics Education on the mathematics attitudes of students studying in Turkey were investigated through meta-analysis, 23 effect sizes of 22 studies were calculated. There are 20 positive and three negative effect sizes. This result shows that RME has a favourable effect on the experimental group in 20 studies. The overall effect size value is positively signed and was calculated as 0.652 with 0.101 standard error. This value is moderate as stated by Cohen et al. (2007). In this regard, it can be concluded that the RME teaching has a favourable effect of moderate level on the mathematics attitudes of students. This conclusion is in line with the findings of prior research (Fauzan, 2002; Kurt & Doğan, 2019; Turmudi & Maulida, 2019; Üzel & Mert Uyangör, 2006; Zulkardi, 2002) which suggest that RME has a favourable effect on mathematics attitude. The three negative-signed effect sizes obtained as a result of the research show that RME has no significant effect on mathematics attitude. This finding is in line with earlier research (Hough et al., 2017; Korkmaz & Korkmaz, 2017; Zakaria & Syamaun, 2017) which are stated that RME has no significant effect on mathematics attitude.

As moderators of the present research, the level of education, field of study, implementation period, and sample size were specified. The moderator analysis revealed that there was no statistically significant difference in the level of education between the groups. The effect sizes calculated for each group were ES=0.902 for primary school, ES=0.522 for middle school, and ES=0.488 for high school. As a result, the effect sizes calculated for primary and middle schools indicate moderate effect, whereas the effect sizes calculated for high school indicate modest effect (Cohen et al., 2007).

There was no statistically significant difference in the field of study between the groups. The effect sizes calculated for each group were ES=0.676 for mathematics and ES=0.586 for geometry. As a result, the effect sizes calculated for mathematics and geometry indicate moderate effect (Cohen et al., 2007).

There was no statistically significant difference in the implementation period between the groups. The effect sizes calculated for each group were ES=0.734 for 6-10 periods, ES=0.508 for 11-15 periods and ES=0.446 for 16-20 periods. As a result, the effect sizes calculated for 6-10 periods indicate moderate effect, whereas the effect sizes calculated for 11-15 periods and 16-20 periods indicate modest effect (Cohen et al., 2007).

There was a statistically significant difference in the sample size between the groups. The effect sizes calculated for each group were ES=0.523 for 16-30 participants, ES=0.665 for 31-45 participants and ES=1.207 for 46-60 participants. As a result, the effect sizes calculated for 16-30 participants and 31-45 participants indicate moderate effect, whereas the effect sizes calculated for 46-60 participants indicate strong effect (Cohen et al., 2007).

As a result, RME has a favourable moderate effect on mathematics attitudes of the students studying in Turkey. Based on this, RME-based teaching can be performed for the students who have negative attitude towards mathematics. In this research process, there was not found any undergraduate study examining the effects of RME on mathematics attitude. Therefore, the subject can be conducted at the undergraduate level.

In this research, the effect of RME on students' mathematics attitude was examined. In future studies, the effects of RME on mathematics achievement, retention of learning, metacognitive thinking skills, learning motivations, mathematics anxiety, etc. can be examined. The effects of RME on mathematics attitude can be examined with different moderators to be determined.

STATEMENTS OF PUBLICATION ETHICS

In this research, the data were collected from open access and published studies. Scientific ethics and publication ethics norms were followed at every stage of the research.

CONFLICT OF INTEREST

There are no conflicts of interest associated with this research.

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A Bibliometric Analysis of Cyberbullying Research in Turkey

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ABSTRACT

This study aims to analyze cyberbullying research in Turkey through bibliometric analysis. To this end, the study dealt with six research questions which included the most frequently used keywords and co-occurrences of these keywords, Turkey's collaboration with other countries, the frequency distribution of articles and citations by year, the most cited articles, the most productive journals, and authors. The bibliometric data were limited to the Web of Science (WoS) database. The first search yielded a total of 3974 publications. However, excluding the publications which did not comply with the aim of the study resulted in 105 articles to be analyzed. The findings suggested that there were 268 keywords used at least once. The keywords occurring at least five times other than *"cyberbullying"* were *"cyber victimization," "adolescent," "bullying," "reliability," "validity,"* and *"internet addiction."*. Turkey had at least one collaboration with 21 countries. The top five countries with at least two collaborations were England, the U.S.A., Australia, Hungary, Czech Republic, and Germany. The most productive year was 2021. The most cited article was published in 2010, and the most influential journal was *"Education and Science."* It was also revealed that the fifteen most productive authors had 57 publications. Considering the increasing interaction among people in virtual environments, cyberbullying research which has a nearly quarter-century history, should take more attention from Turkish scholars. Additionally, a gap was observed in the literature regarding studies conducted on parents. Thus, further studies may attempt to fill this gap.

Keywords: cyberbullying, Turkey, bibliometric analysis.

Türkiye'de Yapılan Siber Zorbalık Çalışmalarının Bibliyometrik Analizi

ÖZ

Bu araştırmanın amacı, Türkiye'deki siber zorbalık çalışmalarının bibliyometrik profillerini ortaya koymaktır. Bu amaç doğrultusu altı alt amaç belirlenmiştir. Bu alt amaçlar; en sık kullanılan anahtar kelimeler ve bu anahtar kelimelerin ilişki ağlarını, Türkiye'nin diğer ülkelerle ilişki ağlarını, makale ve atıf sayısının yıllara göre dağılımını, en çok atıf alan makaleleri, en çok yayın yapan dergileri ve en üretken yazarları içermektedir. Araştırmada bibliyometrik yöntem kullanılmıştır. Veriler Web of Science (WoS) ile sınırlandırılarak sadece bu veritabanı üzerinden elde edilmiştir. Ilk taramada 3974 yayın olduğu ortaya çıkarken, çalışmanın kriterlerine uymayan araştırmalar hariç tutulmuş ve analizler 105 yayın ile gerçekleştirilmiştir. Elde edilen bulgulara göre; 105 makale içerisinde en az bir kez kullanılan 268 anahtar kelimenin olduğu tespit edilmiştir. "Cyberbullying" dışında en az beş kez kullanılan anahtar kelimelerin; cyber victimization, adolescent, bullying, reliability, validity and internet addiction olduğu belirlenmiştir. 105 makale içerisinde Türkiye'nin 21 farklı ülke ile en az bir ilişki ağının olduğu ve en az iki ilişki ağına sahip beş ülkenin sırasıyla; England, USA, Australia, Hungary, Czech Repunlic and Germany olduğu tespit edilmiştir. En fazla çalışmanın 2021 yılında gerçekleştirildiği gözlenmiştir. En fazla atıf alan makalenin 2010 yılında yayınlandığı, en fazla makale yayını olan derginin "*Education and Science*" olduğu tespit edilmiştir. En üretken ilk 15 yazarın toplam 57 çalışmasının olduğu da son bulgu olarak ortaya konmuştur. Sonuç olarak insanlar arası etkileşimin sanal dünyada her geçen arttığı düşünüldüğünde; yaklaşık çeyrek asırlık bir geçmişi olan siber zorbalık araştırmalarının Türkiye'de daha fazla çalışılması gerektiği söylenebilir. Ayrıca aileler ile yapılan çalışmaların da yeterli düzeyde olmadığı ve ailelerle ilgili çalışmalara ağırlık verilmesi gerektiği düşünülmektedir.

Anahtar kelimeler: siber zorbalık, Türkiye, bibliyometrik analiz

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1 | INTRODUCTION

Interaction through virtual environments brought about some conveniences and opportunities but simultaneously problems. Scientific research, policies, and practices suggested by academicians or educators could not prevent the problematic use of the internet (Lan et al., 2022; Ng et al. 2022). This failure can be attributed to young people's adapting to technological innovations more quickly and skillfully than adults, insufficient adult supervision, inappropriate child-rearing. The problematic use of the internet includes gaming, gambling, social media addictions, pornography, drug abuse/encouragement, fraud, and cyberbullying/victimization (Agastone et al. 2007). Among these increasing problems, violence-related ones stand out, and violence gained a different dimension via virtual environments. In this sense, cyberbullying is one of the leading problems (Sezgin Nartgün & Limon, 2020). The literature suggests that cyber victims doubled in nine years between 2009 and 2016 (Hatchin and Hinduja (2016). It was reported that the situation even worsened during the Covid-19 pandemic (Barlett et al. 2021). Cyberbullying is defined as aggression through modern communication tools (Belsey, 2004; Slonje & Smith, 2008). For an aggressive behavior to be considered bullying or cyberbullying, it must be repetitive, intentional, and hostile (Belsey, 2004; Patching & Hinduja, 2015). Cyberbullying emerges when a person or group deliberately intimidates, slanders, insults, threatens, or embarrasses others through information technology (Feinberg & Robey, 2008). Willard (2007) listed eight types of cyberbullying behaviors: flaming, harassment, denigration, impersonation, outing, trickery, exclusion, and cyberstalking.

Cyberbullying is similar to traditional bullying in many ways. However, it is distinct in that cyberbullying can be conducted through instant messaging on mobile devices, social media, and the internet and other electronic devices (Ayas & Horzum, 2010; Erdur-Baker & Kavşut, 2007; Kowalski et al. 2014). Cyberbullying is a type of bullying that is not face-to-face but takes place in virtual environments (Mason, 2008). Additionally, in traditional bullying perpetrator is always apparent, whereas in cyberbullying, it is not always possible to know who it is (Zuckerman, 2016). It is possible to bully with an anonymous name and profile picture in the virtual environment. On the other hand, there might be an association between traditional bullying and cyberbullying. When the bully and victim know each other in person, cyberbullying can turn into traditional bullying (Shariff & Hoff, 2007) or vice versa. However, Barlett (2017) argued that psychological processes associated with cyberbullying should be explained by considering them completely separate from traditional bullying within the Barlett and Gentile Cyberbullying Model framework. The model suggests a clear distinction between cyber and traditional bullying, which might also improve the effectiveness of prevention and intervention efforts. According to Barlett (2017) and Bartlett and Gentile (2012), although there is a close association between traditional and cyberbullying, cyberbullying is distinct in that the bully has anonymity and their physical condition is secondary. The authors also state that cyberbullying is a learning process and becomes a personal trait after some repetitions, which becomes a cycle. The Bartlett and Gentile Cyberbullying Model suggests that cyberbullying becomes habitual after repeated several times. On the other hand, the model is criticized for undervaluing the effect of personality traits that were significantly associated with cyberbullying (Tanrıkulu & Erdur-Baker, 2021). A recent study also showed that cyberbullying is associated with self-control (Peker & Yıldız, 2021). The underlying causes of being a cyberbullying or victim can be associated with all the internal and external psychological factors.

Cyberbullying is considered a crime (Henry & Powell, 2016; Serebrennikova et al. 2021), and there should be at least one victim to define behavior in the virtual environment as cyberbullying. The victim should also suffer psychologically, physiologically, socially, or financially. Cyberbullying restricts the victim's freedom and causes financial or psychological harm. It is also a violation of others' rights. Cyberbullying has serious consequences both for the bully and victim. Previous studies in the literature discussed the psycho-social factors associated with cyberbullying, legal rights and responsibilities, and the informatics-based technical framework. There are also longitudinal studies recently. These longitudinal studies suggested that cyberbullying has detrimental effects such as depression, loneliness, anti-social or asocial behaviors, low self-esteem, life satisfaction, or self-esteem, academic failure, suicide (Hinduja & Patchin, 2019; Isik & Ozdemir, 2019; Wolke et al. 2017; Zych et al., 2017).

PREVIOUS BIBLIOMETRIC RESEARCH ON CYBERBULLYING

The scholars have been working diligently to reveal the causes and consequences of cyberbullying for nearly two decades. There is a considerable knowledge accumulation in national and international databases, giving rise to document, bibliometric, meta-analysis studies. However, bibliometric analysis requires rich literature on a

specific research field (Ellegaard & Wallin, 2015). When we consider the quarter-century history of research on cyberbullying, it allows researchers to conduct a bibliometric analysis. Thus, various disciplines show a growing interest in the bibliometric study. Bibliometrics reveal the concepts and the productivity and network of universities, authors, and countries on a specific research topic. Since software such as VOSviewer allows to obtain valid and reliable bibliometric findings, bibliometric analysis attracts increasing attention from researchers. A comprehensive literature review yielded four bibliometric studies on cyberbullying (See Table 1). These studies retrieved their data from reputable databases such as WoS or Scopus. They revealed the most frequent keywords, the most productive authors, articles, universities, and countries and their co-occurrences.

Caceres-Reche et al. (2019) searched Scopus and limited their search with the keywords of *"adolescent"* and *"child"* and the date between 2004-2018. The study by Lopez-Meneses et al. (2020) included 2004-2019 in the Scopus database and investigated socioeconomic influences of cyberbullying in the educational context globally. On the other hand, Gonzales-Moreno et al. (2020) examined the trends in cyberbullying research in WoS between 2003-2020. Lastly, Barragan-Martin et al. (2021) conducted a bibliometric analysis on research cyberbullying in adolescents between 2010-2020 indexed in WoS. Table 1 below presents these studies.

Table 1. Bibliometric studies on cyberbullying

Research Title	Author(s)	Year	Search word(s)	Database	Documents	Timespan	Limitations
The Phenomenon of Cyberbullying in the Children and Adolescents Population: A Scientometric Analysis.	Cáceres-Reche, M. P., Hinojo-Lucena, F. J., Navas-Parejo, M. R., & Romero-Rodríguez, J. M.	2019	cyberbullying AND children; cyberbullying AND adolescent	Scopus	1097	2004-2018	Adolescents and children
Socioeconomic effects in cyberbullying: Global research trends in the educational context.	López-Meneses, E., Vázquez-Cano, E., González-Zamar, M. D., & Abad-Segura, E.	2020	"cyberbullying", "cyber-bullying", "social", "economic" and "education"	Scopus	1128	2004-2019	Socio-economic effects
Cyberbullying and education: State of the art and bibliometric analysis.	González-Moreno, M. J., Cuenca-Piqueras, C., & Fernández-Prados, J. S.	2020	"cyberbull*"	WoS	2227	2003-2020	-
Study of Cyberbullying among Adolescents in Recent Years: A Bibliometric Analysis	Barragán Martín, A. B., Molero Jurado, M. D. M., Pérez-Fuentes, M. D. C., Simón Márquez, M. D. M., Martos Martínez, Á., Sisto, M., & Gázquez Linares, J. J.	2021	cyberbullying AND adolescent OR youth OR teenagers OR adolescence	WoS	1276	2010-2020	Adolescents

This is a country-specific study including cyberbullying research conducted in Turkey and will contribute to the literature in that it will reveal the most influential studies by Turkish scholars. It will also exhibit the trends and gaps in cyberbullying WoS indexed literature in Turkey. The study will steer further research by showing the bibliometric profile of existing research on cyberbullying.

This study mainly aims to conduct a bibliometric analysis of research on cyberbullying in Turkey. To this end, the study sought answers to the following questions:

RESEARCH QUESTIONS

1. What are the most frequently used keywords in research on cyberbullying and co-occurrences of these keywords?
2. What is the collaboration pattern of Turkey with other countries?
3. What is the frequency distribution of articles and citations by year?
4. What are the most influential articles in Turkey?

5. What are the most influential journals publishing on cyberbullying?
6. Who are the most productive scholars in Turkey publishing cyberbullying research?

2 | METHOD

This study employed a qualitative design and used primary data sources to conduct data mining and descriptive analysis. It included only the WoS database to survey high-quality articles.

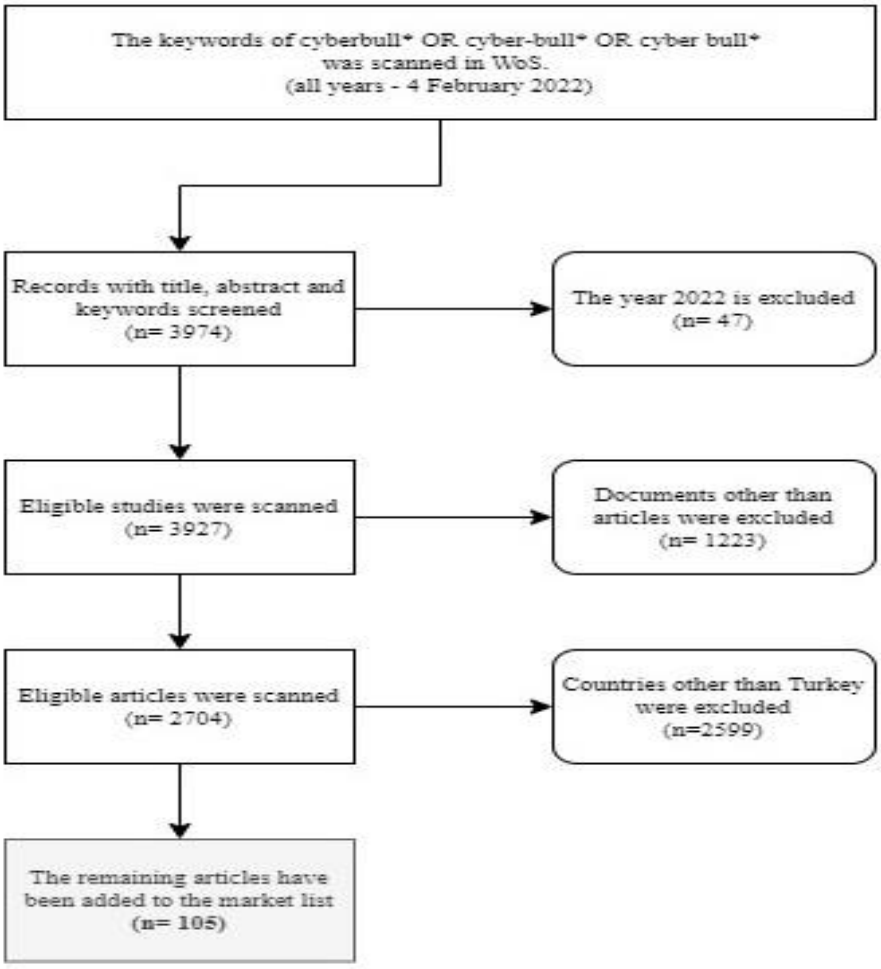

Figure 1. *Flowchart of the study*

First, the literature on cyberbullying indexed by the Web of Sciences (WoS) database was reviewed in February 2022. To reach the most relevant studies, search terms of *"cyberbull*", "cyber bull*"* and *"cyber-bull*"* in TOPIC (title, abstract, and keywords) were used. All terms were searched simultaneously using the "OR" link. The search results were added to WoS marked list (N=3974). Since the study was carried out in January-February 2022, it excluded publications in 2022 (N=47). "Early Access (N=130)", "Book Chapters (N=160)", "Proceedings Papers (N=508)", "Review Articles (N= 182)", "Editorial Materials (N=99)", Meeting Abstract (N=82)", "Book Reviews N=42)" and other documents such as "Corrections, News Items, Letters, Books, Data Papers, Withdrawn Publication (Total N=43)" were also refined. On the other hand, 23 publications appearing both in the article and other categories were included in the analysis. Following these filtering, 2704 articles emerged, and these articles were analyzed within the scope of the second research question *(What is the collaboration pattern of Turkey with other countries?)* in VOSviewer. A further filter was applied to exclude the research in other countries, resulting in 119 articles conducted in Turkey. All these articles' titles, abstracts, and keywords were checked to ensure relevancy. During this stage, it was noticed that 14 papers were in the Turkish language but not conducted in

Turkey. Thus, they were not included in the analysis carried out on 105 articles. It was also determined that the first study of Turkey origin was in 2007 in the WoS database.

In some bibliometric maps, a concept might likely emerge due to typing errors or different spellings (e.g., self-esteem, selfesteem, self esteem). This prevents researchers from reaching accurate findings. To avoid this, a strategy was used in the study. Using the "find+change" feature of the .txt file downloaded from WoS, the terms cyber-bullying and cyber bullying were combined as "cyberbullying" and the terms "cybervictimization" and "cyber-victimization" as "cyber victimization". Then, the old and edited formats of the file were compared, and it was observed the problem was resolved, which increased the chance of reaching more accurate findings.

INCLUSION CRITERION

The articles included in the study were based on the following criterion:

- indexed in WOS database,
- dealing with only *"cyberbullying"*,
- conducted in Turkey.

RESEARCH ETHICS

Since this is a bibliometric study, it did not require ethical or legal consent.

3 | FINDINGS

Figure 2 below shows that 268 keywords occurred at least once in 105 articles. 176 keywords co-occurred with cyberbullying, and the total link strength was 259. On the other hand, there were 61 keywords co-occurring with *"cyber victimization"* and the total link strength was 99. Keywords occurring at least five times other than *"cyberbullying"* were *"cyber victimization (f=30)"*, *"adolescent (f=17)"*, *"bullying (f=12)"*, *"reliability (f=5)"*, *"validity (f=5)"*, and *"internet addiction." (f=5)"*. By total link strength, the first five keywords were the same. The most frequently co-occurring keywords with cyberbullying was *"cyber victimization"* with a link strength [Ls]= 26. Considering keywords of *"adolescent"* (Ls=13) and *"high school students"* (Ls=3), their total link strength is 16. *"Cyberbullying"* and *"bullying"* co-occurred nine times and *"cyberbullying"* and *"traditional bullying"* four times.

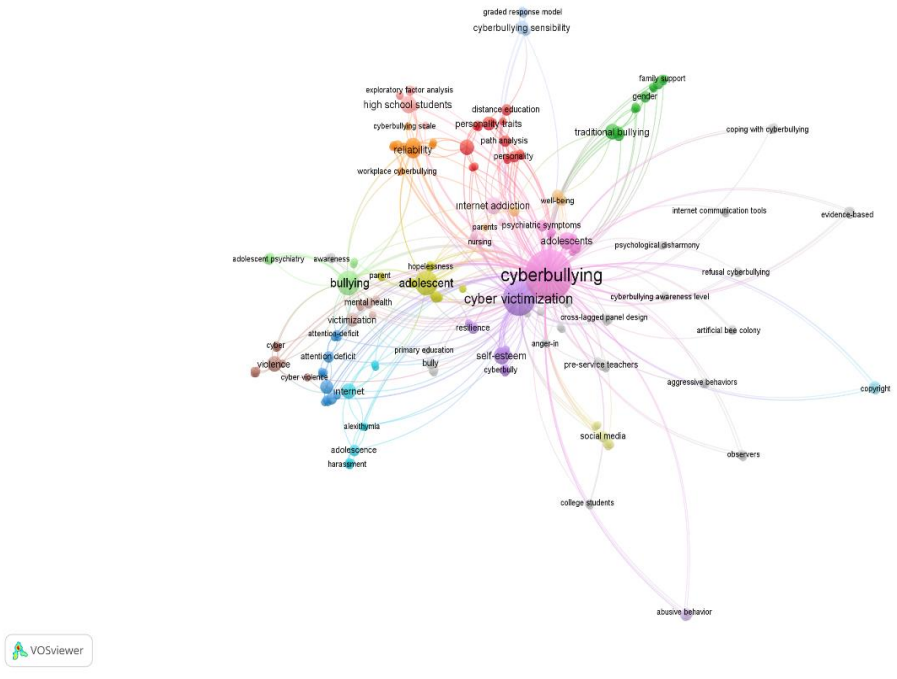

Figure 2. *Network map between the keywords of articles published on cyberbullying in Turkey*

Figure 3 shows co-authorship by countries. As the figure shows, Turkish scholars had co-authorship with scholars from 21 countries out of 92, corresponding to 22.8%. By their Ls with Turkey, these countries can be listed as follows: England (f=7), the U.S.A. (f=5), Australia (f=4), Hungary (f=2), Czech Republic (f=2), Germany (f=2), Austria, China, Cyprus, Estonia, Greece, India, Italy, Japan, Kuwait, Luxembourg, Malaysia, Pakistan, Saudi Arabia, Sweden, and Taiwan. As listed above, Turkish scholars had the most co-authorships with scholars from England, the U.S.A., and Australia. Shortly, Turkey had collaborations on cyberbullying research with 21 countries out of 92.

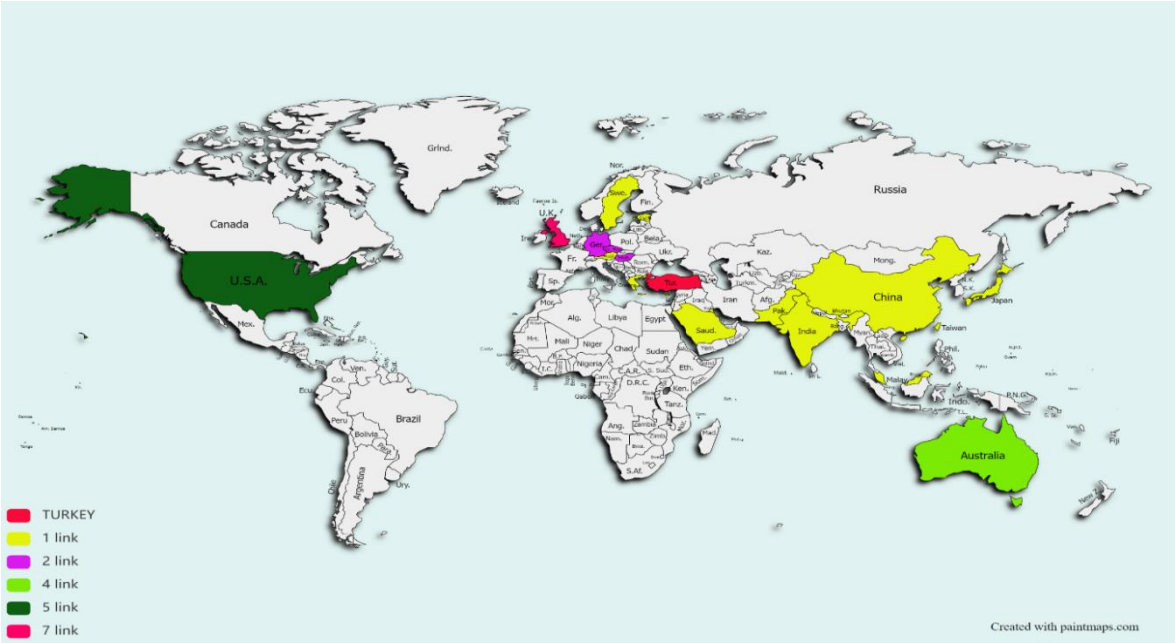

Figure 3. *Collaboration world map of cyberbullying research conducted in Turkey*

Figure 4 shows the frequency distribution of articles and citations by year. As shown in the figure, the first publication was in 2007. A steady increase was observed until 2007, and the most productive year was 2021, with 17 articles. Although there were dramatic declines in 2013 (f=5) and 2014 (f=1), there was an increase as of 2015. On the other hand, despite the declines in articles in 2012 and 2014, the number of citations also steadily increased as of 2007, with the exceptions of 2014 and 2021. There were more than 200 citations in 2019, 2020, and 2021 separately. To conclude, 105 articles were cited 1495 times (Average per item= 14.24). The number of articles and citations did not include 2022.

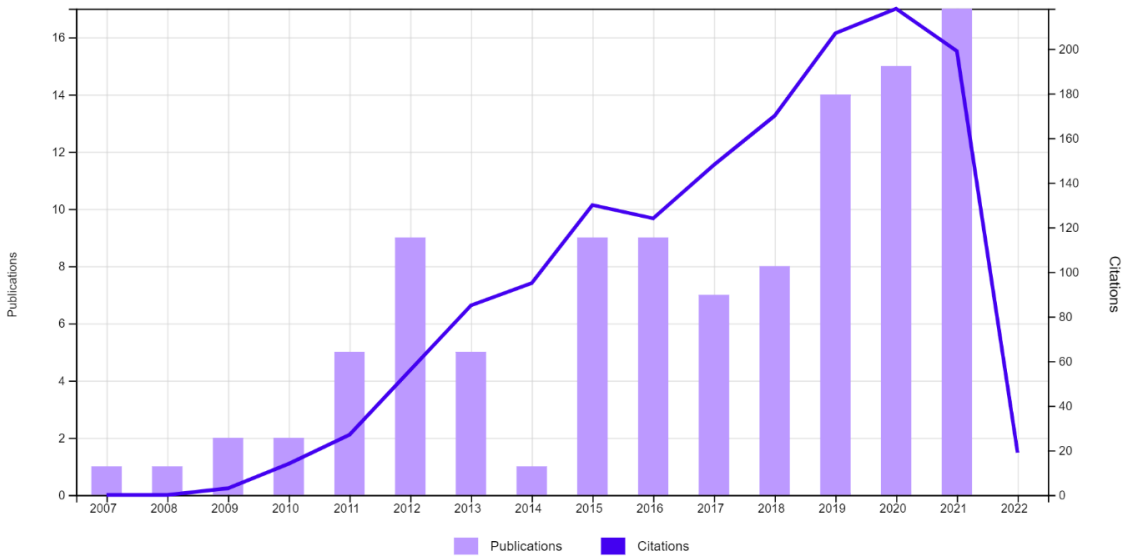

Figure 4. *Frequency distribution of articles and citations by year*

Table 10 shows the ten most cited articles. As the table shows, there was one article with more than 200 citations and two articles with more than 100 citations, all of which were single-authored articles. The first article was *"Cyberbullying and its correlation to traditional bullying, gender, and frequent and risky usage of internet-mediated communication tools"* by Erdur-Baker (2010); the second was *"Psychological needs as a predictor of cyberbullying: A preliminary report on college students"* by Dilmaç (2009) and the third one was *"Psychiatric symptomatology as a predictor of cyberbullying among university students"* by Arıcak (2009). Erdur-Baker contributed to three of the ten most cited articles, while Topçu, Akbulut, and Kirişti contributed two.

Table 2. Ten most cited articles

No	Author(s)	Article Title	Source Title	Citations	Pub. Year	WoS Category
1	Erdur-Baker, O	Cyberbullying and its correlation to traditional bullying, gender, and frequent and risky usage of internet-mediated communication tools	New Media & Society	269	2010	Communication
2	Dilmac, B	Psychological Needs as a Predictor of Cyberbullying: a Preliminary Report on College Students	Kuram ve Uygulamada Eğitim Bilimleri	112	2009	Education & Educational Research
3	Aricak, OT	Psychiatric Symptomatology as a Predictor of Cyberbullying among University Students	Eurasian Journal of Educational Research	104	2009	Education & Educational Research
4	Topcu, C; Erdur-Baker, O; Capa-Aydin, Y	Examination of Cyberbullying Experiences among Turkish Students from Different School Types	Cyberpsychology & Behavior	99	2008	Communication, Psychology, Applied
5	Topcu, C; Erdur-Baker, O	Affective and cognitive empathy as mediators of gender differences in cyber and traditional bullying	School Psychology International	82	2012	Psychology, Educational
6	Sahin, M	The relationship between the cyberbullying/cyber victimization and loneliness among adolescents	Children and Youth Services Review	66	2012	Family Studies; Social Work
7	Cetin, B; Yaman, E; Peker, A.	Cyber victim and bullying scale: A study of validity and reliability	Computers & Education	54	2011	Computer Science, Interdisciplinary Applications; Education & Educational Research
8	Akbulut, Y; Erişti, B	Cyberbullying and victimization among Turkish university students	Australian Journal of Educational Technology	50	2011	Education & Educational Research
9	Ak, S; Özdemir, Y; Kuzucu, Y.	Cyber victimization and cyberbullying: The mediating role of anger, don't anger me!	Computers in Human Behavior	53	2015	Psychology, Multidisciplinary; Psychology, Experimental
10	Akbulut, Y; Şahin, YL.; Erişti, B	Cyberbullying Victimization among Turkish Online Social Utility Members	Educational Technology & Society	49	2010	Education & Educational Research

Figure 5 displays journals in which the articles were published. The findings suggested that *Education and Science* was the most productive journal with six articles. Five articles were published in *Computers in Human Behavior* and *Eurasian Journal of Education Research;* four articles in *Kuram ve Uygulamada Eğitim Bilimleri*; three in *Anatolian Journal of Psychiatry* and *School Psychology International*. The journals publishing cyberbullying research were mainly educational sciences, psychology, and informatics.

Figure 5. *TreeMap of journals*

Table 3 shows below that the 15 most influential authors published 57 articles. The findings suggested that Özgür Erdur ranked first with seven and Adem Peker second with six articles. It was also striking that Özgür Erdur-Baker ranked first by the number of articles, citations, and total link strength. One of the authors had more than 500, and four authors had more than 100 citations. Although Çiğdem Topçu, Osman Tolga Arıcak, and Bahadır Erişti each had three articles, it was noteworthy that they had more than 100 citations. By citations, Çiğdem Topçu ranked second whereas by total link strength Osman Tolga Arıcak did. However, the ranks in the table may vary by publications, citations, or total link strength.

Table 3. The most productive authors

No.	Author	Articles	Citations	Total Link Strength
1	Özgür Erdur-Baker	7	508	145
2	Adem Peker	6	78	85
3	Yavuz Akbulut	4	102	79
4	Zehra Uçanok	4	23	16
5	Didem Arslantaş	4	10	19
6	Alaettin Ünsal	4	10	19
7	Tuncay Ayas	4	8	30
8	Çiğdem Topçu	3	185	59
9	Osman Tolga Arıcak	3	139	96
10	Bahadır Erişti	3	101	78
11	Serkan Volkan Sari	3	45	36
12	İbrahim Tanrıkulu	3	30	24
13	Yüksel Eroğlu	3	28	71
14	Zeynep Demirtaş	3	10	11
15	Fuat Bakioğlu	3	3	12
	Total	**57**	**1280**	-

4 | DISCUSSION & CONCLUSION

This study aimed to reveal the bibliometric profile of research on cyberbullying conducted in Turkey. To this end, the study focused on keywords, the collaboration between Turkey and other countries, the frequency distribution of articles and citations by year, the most influential articles and journals, and the most productive authors. A comprehensive literature review showed that there were already four bibliometric analyses on cyberbullying research. Two of them were limited to adolescents (Cacares-Reche et al. 2019; Barragan Martin et al. 2021), one to the effect of socio-economic status on cyberbullying (Lopes-Meneses et al. 2020), and the other one on cyberbullying in general (Gonzales-Moreno et al. 2020). The current study is original because it is country-specific (Turkey) and includes 2021, which shows that it is up to date. Considering the current and previous studies, they are different in terms of their limitations, timespan and databases included. Thus, this study has the potential to contribute to the existing literature using bibliometric analysis, which is still in its infancy, providing a different perspective.

The findings suggested that emerging topics of cyberbullying were cyber victimization and adolescents, which was consistent with previous literature (Gonzales-Moreno et al. 2020; Cacares-Reche et al. 2019). It was also shown that the focus of studies conducted in Turkey was consistent with international studies. A frequent term used in studies conducted in Turkey was “bullying.” Some researchers claim that cyberbullying is not bullying and should be considered as a completely different phenomenon from traditional bullying (Barlett, 2017). However, the current study’s findings showed that cyberbullying in Turkey was associated with conventional bullying.

The terms *self-esteem, violence, attention deficit, psychiatric symptoms, mental health, hyperactivity disorder, aggression, anger, addiction, narcissism, anxiety disorder, sexual abuse, loneliness,* and *harassment* showed that cyberbullying threatens mental health, and it is a problem that is a direct field of research for psychology. Additionally, keywords such as *distance education, computer security, cellular phone, machine learning, online social games, digital/internet safety, internet technologies, cyber* indicated that cyberbullying is also within the interest of information technologies. As for family, parenting, and legal dimensions, there were only a few

keywords *(digital parenting, parenting strategy, family relations, cybercrime, criminal law),* and their link strength was low. In other words, it can be concluded that studies on cyberbullying in Turkey mostly focused on the aspects affecting mental health. There were few studies concerning the technical dimension. Parenting roles and the legal aspect of cyberbullying were ignored. On the other hand, cyberbullying did not attract enough attention in sociology. However, it is a violence-related phenomenon, and some of the terms in the studies indicate cyberbullying's association with sociology. The words in the bibliometric map which are thought to be related to sociology can be listed as *violence tendency, violence, Turkish ethnic children, Turkish, Turkey, social media analysis, ethnic minorities, ethnic-based cyberbullying.*

Cyberbullying has increased during the Covid-19 pandemic (Alsawalqa, 2021; Barlett et al. 2021; Utemissova et al. 2021). However, only one keyword related to Covid-19 emerged (Sengil Akar & Kurtoglu Erden, 2021), which implies that further studies should be conducted investigating the situation within the pandemic framework in Turkey.

The findings on Turkey's collaborations with other countries revealed that it did not collaborate with countries from South America and Africa. Additionally, it can also be noted that Turkey did not collaborate with Turkic Republics. As for neighboring countries, co-occurrences emerged between Turkey, Greece, and Cyprus. On the other hand, European countries and Turkey did not collaborate much. The collaborations were mostly with the U.S.A., England, and Australia (Ls=16), corresponding to 43% of the total Ls (f=37). It was concluded that authors from 92 countries published a bibliometric study on cyberbullying. The number of studies conducted in Turkey was relatively high compared to other countries. Still, Turkey collaborated with only 21 countries, and nearly half of the link strength was with only three countries, indicating a need to diversify the country collaborations.

Lastly, the findings indicated that the first article on cyberbullying in the WoS database appeared in 2003, but the first Turkey origin study was in 2007. Thus, it can be concluded that scholars from Turkey fell behind the up-to-date trend in cyberbullying research, which also influences the number of articles and citations. There were fluctuations between 2012 and 2018. As of 2019, there was a growing body of literature on cyberbullying. With the more common use of personal smartphones in the 2010s, technology-related problems became more widespread, steered researchers' attention to the studies on problematic use of technology. In other words, the growth in cyberbullying literature can be attributed to the more widespread and frequent use of digital tools.

Limitations and Suggestions

The current study is limited to the WoS database and Turkey origin research on cyberbullying. The previous four and this bibliometric study included only one database (WoS or Scopus). Thus, further studies can be conducted, including both databases. In countries with enough knowledge of cyberbullying, country-specific bibliometric studies can be carried out. Researchers from sociology can discuss cyberbullying in terms of its social consequences, which can contribute to existing literature. Researchers from psychology mainly dealt with psychological problems and psychological symptoms of cyberbullying. Through applied and descriptive studies, further research should emphasize digital parenting, parenting roles, and family roles. It can also be suggested that the researchers discuss cyberbullying within the Covid-19 pandemic in Turkey. Finally, researchers from Turkey should develop more international collaborations, which will improve Turkey's contribution to international literature.

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Reliability and Validity of the Team-Work Scale at Tertiary Level

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ABSTRACT

This study aims to evaluate the validity and the reliability of measurement of 'Team-Work' scale to understand the perception of international students' collaboration with other students in a multicultural setting. The scale for this study adapted from a measurement tool, which initially designed to explore the impact of individuals' intercultural communication competence on multicultural team performance in international organizations. Initial sampling group for was 350 university students however, 168 returned questionnaires provided sufficient data for the conclusion drawn for this research study: The scale of Team-Work was constructed with 18 items and the confirmatory factor analysis (CFA) to test the replicability and the accuracy of the scale and it was confirmed that the final structure of the scale including 18 items with one dimension. The Cronbach's alpha coefficient values for the subscales were considered to be high (i.e. flexibility: 0.842 and inflexibility: 0.802).

Keywords: Reliability, validity, scale adaptation, communicative competence, team-work

Çok Kültürlü Eğitim Ortamında Takım Çalışması Ölçek Değerlendirmesi

ÖZ

Bu çalışma, uluslararası öğrencilerin çok kültürlü bir ortamda diğer öğrencilerle işbirliğine ilişkin algısını anlamak için 'Takım-Çalışması' ölçeğinin ölçümünün geçerliliğini ve güvenilirliğini değerlendirmeyi amaçlamaktadır. Bu çalışma için, başlangıçta bireylerin kültürlerarası iletişim yetkinliğinin uluslararası organizasyonlarda çok kültürlü takım performansı üzerindeki etkisini araştırmak için tasarlanmış bir ölçek uyarlanmıştır. İlk örneklem grubu 350 üniversite öğrencisi olmasına rağmen 168 öğrenciden toplanan veriler bu araştırma çalışması için kullanılabilmiş ve bu araştırmanın amacına uygun yeterli veri sağladığı değerlendirilmiştir. 18 maddeden oluşan Takım Çalışması ölçeğinin tekrarlanabilirliğini ve tutarlılığını test etmek için doğrulayıcı faktör analizi (DFA) uygulanmış ve 18 maddeden oluşan ölçeğin son yapısının tek boyutlu olduğu teyit edilmiştir. Oluşturulan alt ölçekler için Cronbach alfa katsayısı değerlerinin (esnek olma: 0,842 ve esnek olmama: 0, 802) yüksek olduğu kabul edilmiştir.

Anahtar kelimeler: Geçerlilik, güvenirlilik, ölçek çalışması, kültürlerarası iletişim edinci, takım çalışması

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1 | INTRODUCTION

Internationalization of higher education has been encountered in almost all countries since the second half of the 20th century. Internationalization in higher education involves various activities such as, mobility of students and faculty staff, collaboration among educational institutions. In recent years, a significant increase in student mobility has been observed throughout the world and new tools, mechanisms and collaborations are developed in this direction (Çetinsaya, 2014). Since the 1980s, intercultural interaction has increased under the influence of globalization, and as a result, studies have started to reveal the nature of intercultural communication skills / competencies (e.g. Chen, 1990; Collier, 1989; Dinges, 1983; Kim, 1994; Ward & Kennedy, 1994; Wiseman & Koester, 1993) (as cited in Dai and Chen, 2014). The relationship with other languages and cultures leads to the development of intercultural communicative competence. Intercultural communicative competence (ICC) offers a chance to transcend one's own worldview boundaries. Anyone who has not experienced other cultures or has not experienced the difficulty of communicating through another language is generally insensitive to the environment in which s/he exists (Gökmen, 2005). In recent years, more research studies have been conducted on intercultural communication competence. Likewise, the Council of Europe highlights activities promoting linguistic and cultural diversity as part of its policy of building European identity (Alexsandrowicz-Pedich et al., 2003) and supports studies on developing intercultural competence and cultural awareness (e.g. Root & Ngampornchai, 2012; Almarza, Martinez & Llavador, 2017).

Recently, there has been growing emphasis in tertiary education that students should develop professional skills as part of their education. Skills such as problem solving, communication, collaboration, interpersonal and social skills are actively being targeted by prospective employers as main requirements and therefore, collaboration and teamwork are emphasized to be essential in almost all working environments (Boakye, 2015). As Walinski (2013) emphasized that the development of ICC is essential not only for students who wish to pursue careers in international workplaces but also for those who need to work effectively in the contemporary world (cited in Lee, 2019, p. 178). Research studies conducted by Chang and Tharenou (2004) and Kayes, Kayes and Kolb (2005) indicated that multicultural teamwork provides numerous possibilities for the individuals to learn on the job and this greatly adds to their life-long learning. The development of individual competences such as appropriate linguistic and communicative skills, cultural empathy, conflict resolution skills or learning on the job seem to be essential for transnational teamwork, which is regarded as a collective, cooperative, collaborative and social learning experience (Garcia & Canado, 2005). Garcia and Canado (2005) conducted a qualitative study to gain an insight into the development of intercultural competence in actual multicultural team dynamics and reflect on the mobility students and professionals' development of their plurilingual competence.

In a nutshell, multicultural teamwork provides a valuable opportunity for international students not only for their personal growth but also for their intercultural communicative competence. Studies in team-work literature is mainly job-related and there have been very limited multicultural team-work studies in the field of education. Therefore, there is a need to construct a scale to reflect on their collaboration with their pairs in a multicultural setting and their intercultural communication development. This study is designed to assess reliability and validity of a scale adapted from Matveev (2002), which investigates how different cultures perceive intercultural communication competence and its impact on multicultural team performance in multicultural companies and international organizations. It is also necessary to identify international students' understanding of collaboration with other students in a multicultural setting in order to help them to reduce their anxiety and to improve their communicative competence skills. As stated above, previous studies which use the original scale developed by Matveev (2002) mainly focused on the perception of colleagues of multicultural team performances and its impact on their intercultural development. For the present study, the scale was adapted to collect data in a multicultural education setting since there was a dearth of literature that specifically addresses the perception of international students on their collaboration with their pairs in a multicultural setting.

2 | METHOD

This study is a part of a research project which aims to investigate the international students' perception of their intercultural communicative competence development. The "team-work scale" adaptation which constructs the content of the present study was carried out to collect data from the participants of this research study.

PARTICIPANTS

The research data were drawn from a group of exchange students who enrolled in a university abroad (i.e. international university students who pursue their studies in Turkey and also Turkish students group consisted of Turkish exchange students who study abroad as part of the Erasmus exchange program). The data were obtained from 168 participants to evaluate the reliability and validity of the scale adapted from Matveev (2002). The group of the students for this research study was drawn through convenience sampling method. As Cohen, Manion and Morrison (2007) suggests that "captive audiences such as students or student teachers often serve as respondents based on convenience sampling" (p.114).

DATA COLLECTION

A questionnaire adapted from Matveev (2002), which was initially designed to find out the correlation between intercultural communication competence and team effectiveness of multicultural work teams. The theoretical framework of the questionnaire is based on Integrated Intercultural Communication Competence Model (as rooted in Abe and Wiseman's abilities model, 1983) and Cui and Awa's (1992) concept of intercultural effectiveness, which based on four underlying dimensions: interpersonal skills, team effectiveness, cultural uncertainty, and cultural empathy. Each item in the questionnaire was rated on a five-point Likert type scale ranging from 1 to 5 (*1= strongly disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree*).

Matveev (2002) performed a pilot study of 380 participants (corporate managers and students of management) to test the International Communicative Competence Questionnaire (ICCQ) for consistency and internal reliability. The reliability analysis determined a relatively high reliability of the scale of .88 (Tabachnik & Fidel, 1996). In the main study, the ICCQ was employed with reliability $\alpha = 0.88$ and items with a minimum factor loading of .40 and with no cross-loadings over .20 were included (Matveev, 2002). The factor analysis identified four factors (i.e., interpersonal skills, team effectiveness, cultural uncertainty, and cultural empathy), which clearly corresponded with the dimensions of the integrated intercultural communication competence model. 23 items of the ICCQ were constructed around these dimensions of intercultural communication competence. The researcher employed the ICCQ with reliability $\alpha = 0.88$. to survey 124 managers of Russian and American multinational organization managers in Russian and in the United States (Matveev, 2002).

The original questionnaire consisted of 23 items however, for the present study only 18 of them were adapted. Five items of the questionnaire were omitted since they were considered to be relevant to company or organization settings, but irrelevant to the educational context. In this study, about 350 students were sent to test the replicability and accuracy of the scale, however only 168 returned questionnaires providing sufficient data.

DATA ANALYSIS

In the present study, SPSS 25.00 package program and Lisrel 8.80 program were used to analyse the data. Confirmatory factor analysis (CFA) and reliability analysis were carried out to evaluate what extent the scales were compatible with the data obtained in this study.

RESEARCH ETHICS

This research study was evaluated by Middle East Technical University Human Subjects Ethics Committee in 2017 and found ethically acceptable (METU – no: 2017-EGT-056).

3 | FINDINGS

Outcomes of the psychometric properties represented in this study were confirmatory factor analysis, item-test correlations and Cronbach's alpha reliability coefficients and the obtained psychometric results are presented under subheadings in this section.

CONFIRMATORY FACTOR ANALYSIS

Factor analysis can be defined as a multivariate statistic that aims to find and explore fewer conceptually meaningful new variables (factors, dimensions) by putting a large number of interrelated variables together. In other words, factor analysis is applied to reduce a large number of variables and to verify the pre-established factor

structure, rather than giving a single coefficient for the validity of the measuring tool. This technique extracts maximum common variance from all variables and puts them into a common score. The scores obtained as a result of the factor analysis provides a road map for validity and reliability studies to be carried out for further analysis.

Confirmatory Factor Analysis (CFA) is frequently used techniques in scale development and scale adaptation studies. If the relationship among the items is not known, EFA is suggested to be used, but if the relationship is tested and the factors and related items are known, CFA is recommended to be used (Bandalos & Finney, 2010; Büyüköztürk, 2002; Kline, 2011) (cited in Orçan, 2018). Team-work scale, which consist of 18 items, was grouped under two-factor structure (Flexibilty: 3, 4, 5, 6, 7, 9, 13, 14, 15, 16, 18; Inflexibilty: 1, 2, 8, 10, 11, 12, 17), were administered to 168 students. The unweighted least squares (ULS) technique was used as used as estimation method in CFA. As a result of CFA analysis, model fit values, path coefficients, and interdimensional correlations were obtained from the data.

Model fit

Several fit statistics are available to evaluate CFA model fit. In terms of fit measures, if the RMSEA value is less than 0.05, the model fit is good. A value less than or equal to 0.08 is considered acceptable (Schermelleh-Engel, Moosbrugger, & Muller, 2003). Other fit indices used to evaluate the absolute fit in this study were: Goodness of Fit Index (GFI) values between 0.90 and 1.00; Normed Fit Index (NFI) values between 0.90 and 1.00; Non-Normed Fit index (NNFI) values between 0.95 and 1.00; Comparative Fit Index (CFI) between 0.95 and 1.00; and Adjusted Goodness of Fit Index (AGFI) between 0.85 and 1.00 indicates that it is within acceptable limit values.

In this piece of research, reliance on chi-square-to-degrees-of-freedom ratios to test fit were applied. As a result of the confirmatory factor analysis, the fit values obtained for the scale are given in Table 1 below:

Table 1. Model Fit Indices

Scale	X^2	df	X^2/df	RMSEA	RMR	SRMR	GFI	AGFI	NFI	NNFI	CFI
Team-work	212.11	1.34	1.58	0.059	0.081	0.073	0.95	0.94	0.99	1.00	1.00

Note: df: degree of freedom; RMSEA: Root Mean Square Error of Approximation; RMR: Root Mean Square Residual; SRMR: Standardized RMR; GFI: Goodness of Fit Index; AGFI: Adjusted Goodness of Fit Index; NFI: Normed Fit Index; NNFI: Non-Normed Fit Index; CFI: Comparative Fit Index

The chi-square fit value (p <.05) obtained for the scale was found to be significant. However, it can be stated that "Team-Work" scale have an acceptable harmony based on the chi-square / degrees of freedom being lower than 3 (Kline, 2005; Sümer, 2000). As illustrated in Table 1, the error indices RMSEA (0.059), RMR (0.081) and SRMR (0.073) were found. Again, when Table 2 was examined, it was found that among the fit indices GFI (0.95), AGFI (0.94), NFI (0.99), NNFI (1.00), CFI (1.00). When both the coefficients of fit and error coefficients were evaluated together, it could be said that the data model fit was very high. These results showed that the structural properties at the original scale were confirmed. In terms of CFA results, RMSEA (0.059), RMR (0.081) and SRMR (0,073), GFI (0.95), AGFI (0.94), NFI (0.99), NNFI (1.00), CFI (1.00) were acceptable according to the literature, as illustrated in Table 1 and Table 2. Moreover, both the goodness of fit index and error variances were used to evaluate the model fit and it was confirmed that model provided a good fit to the data.

Table 2. Parameters Obtained from CFA

Item no	Estimates	*t*-Values	R^2
1	0.62	15.01*	0.24
2	0.68	16.48*	0.30
3	0.60	12.95*	0.36
4	0.15	3.54*	0.019
5	0.42	9.70*	0.16
6	0.44	10.00*	0.28
7	0.56	12.45*	0.48
8	0.85	19.58*	0.49

9	0.53	11.82*	0.33
10	0.92	20.50*	0.57
11	0.90	20.57*	0.61
12	0.66	15.96*	0.30
13	0.64	13.95*	0.51
14	0.64	13.96*	0.63
15	0.61	13.36*	0.50
16	0.64	13.75*	0.52
17	0.56	13.87*	0.18
18	0.41	9.45*	0.26

*p< 0,05

Table 2 shows that the standardized path coefficients estimated for the items vary between 0.15 and 0.92. All the t values were found to be significant at the 0.05 level. When the R-squared values were examined, the proportion of variance is between 1 percent and 63 percent of the explained variation. As indicated in Table 2, specifically the parameters related to Item 4 appeared to be weak. However, the item was not removed from the scale since the original scale adapted to use in this study and also the sample size was not big enough. Finally, the predictive value of Item 4 determined to be statistically significant.

ITEM-TEST CORRELATION AND RELIABILITY COEFFICIENTS

The internal consistency of the scales used in this study was examined by calculating the Cronbach's alpha values for the entire scale and its sub-factors. If the Cronbach α coefficient, which is the criterion of internal consistency, is below 0.40, the measurement of the scale is "unreliable", it is between 0.40-0.59, the measurement is "low reliability", 0.60-0.79 indicates that the measurement is "quite reliable" and it is between 0.80-1.00. states that the measurement considered as “highly reliable” (Tavşancıl, 2002, p. 29). Internal consistency coefficient values were calculated separately for each sub-dimension of the "Team Work" scales and it emerged that they were quite reliable according to the internal consistency coefficient values for the "Flexibilty" and "Inflexibilty" factors, which were the sub-dimensions of the "Team Work" scale, as illustrated in Table 3 below.

Table 3. Internal Consistency Coefficient Values of The Sub-dimensions of The Scale

Scale	Subscale	Number of Items	Coefficient values
Team-work	Flexibilty	11	0.842
	Inflexibility	7	0.802

When Table 4 is examined, the means of Flexibility subscale items were between 3.40 and 4.35; the standard deviation values ranged between 0.811 and 1.096, and the corrected item-total score correlations varied between 0.217 and 0.711. On the other hand, the mean of the Inflexibility subscale items was between 2.13 and 3.02; the standard deviation values ranged between 1.156 and 1.320, and the corrected item-total score correlations varied between 0.412 and 0.649. According to Table 4, it can be concluded that the averages of the flexibility items were higher, the standard deviations were low and the item-total correlations (item discrimination power) were at the desired level, except for one item (Item 4 of the Flexibility subscale). It was determined that Item 4 was weak in terms of item-total correlation value (discrimination level). However, Item 4 was not excluded from the scale in order to avoid any consistency in the original scale's structure.

Finally, according to Cristobal, Flavian and Guinaliu (2007), the items with corrected item- total correlation lower than 0.30 are not acceptable. However, for the present study 0.20 is acceptable value for inter item and item-the total correlation. In this study, corrected item-test correlations of items, except Item 4, were higher than 0.30 (see Table 4).

Table 4. Descriptive Statistics of Items Scale and Item-test Correlations

Subscale	Items	Mean	Std. Deviation	r*
Flexibilty	Item 3	3.96	0.990	0.584
	Item 4	3.40	1.096	0.217
	Item 5	3.88	1.039	0.385
	Item 6	3.98	0.847	0.549
	Item 7	4.32	0.799	0.582
	Item 9	4.02	0.919	0.527
	Item 13	4.26	0.902	0.620
	Item 14	4.17	0.809	0.711
	Item 15	4.35	0.862	0.614
	Item 16	4.14	0.882	0.615
	Item 18	4.14	0.811	0.467
Inflexibility	Item 1	2.80	1.255	0.470
	Item 2	2.14	1.238	0.493
	Item 8	2.46	1.218	0.605
	Item 10	2.13	1.215	0.629
	Item 11	2.24	1.156	0.649
	Item 12	2.28	1.193	0.505
	Item 17	3.02	1.320	0.412

* Corrected Item-Total Correlation* Corrected Item-Total Correlation

4 | DISCUSSION & CONCLUSION

This study aimed to evaluate the reliability of the validity of a scale for assessing the perception of exchange students' intercultural communication competence and its impact on team-work in multicultural setting at tertiary level. Consideration must be given not only to the results of the study but also the "rigour" of the research that refers to the extent to which the researchers worked to enhance the quality of the studies. In quantitative research, the quality of a research study is achieved through measurement of the validity and reliability (Heale & Twycross, 2015). As Winter (2000) points out, "reliability and validity are tools of an essentially positivist epistemology" (p. 9).

According to the internal consistency coefficient values, it was found out that the values for the subscales were high (flexibility α = 0.842 and inflexibility α = 0.802). Confirmatory factor analysis was also used to determine whether the model fit for the "Team-Work" scale is in the reference range of good fit values. Several fit statistics were used to evaluate CFA model fit and the results confirmed that the hypothesized model provided a good fit to that data and it was consisting of two dimension.

In conclusion, the scale is expected to produce valuable results in order to obtain data about how intercultural sensitivity, based on individuals' flexibility and inflexibility levels, affects teamwork in a multicultural setting. The reliability of the instrument of team-work was ensured through Cronbach's alpha reliability and the validity of the instruments performed through factor analyses. The scale was adapted to explore the understanding of international students' collaboration with their pairs in multicultural setting. It is believed that the instrument can help researchers to identify international students' understanding of collaboration with other students in a multicultural setting and to improve their communicative competence skills. The adapted scale can also be used for the future studies to examine the academic challenges they face and also to identify students' needs to deal with these challenges. It is also expected to provide a trigger for other multicultural team-work studies at tertiary

level. Such research studies might provide directly relevant information for faculty members, educators and might be valuable to researchers who can identify with it.

STATEMENTS OF PUBLICATION ETHICS

Throughout this research study, research and publication ethics were observed. Ethical permission of the present research was approved by Middle East Technical University Human Subjects Ethics Committee.

RESEARCHERS' CONTRIBUTION RATE

Author 1: Investigation, Resources, Visualization, and Writing - original draft.

Author 2: Methodology, Supervision, Software, Formal Analysis and Validation.

CONFLICT OF INTEREST

The authors declare no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in BUEFAD belongs to the author(s).

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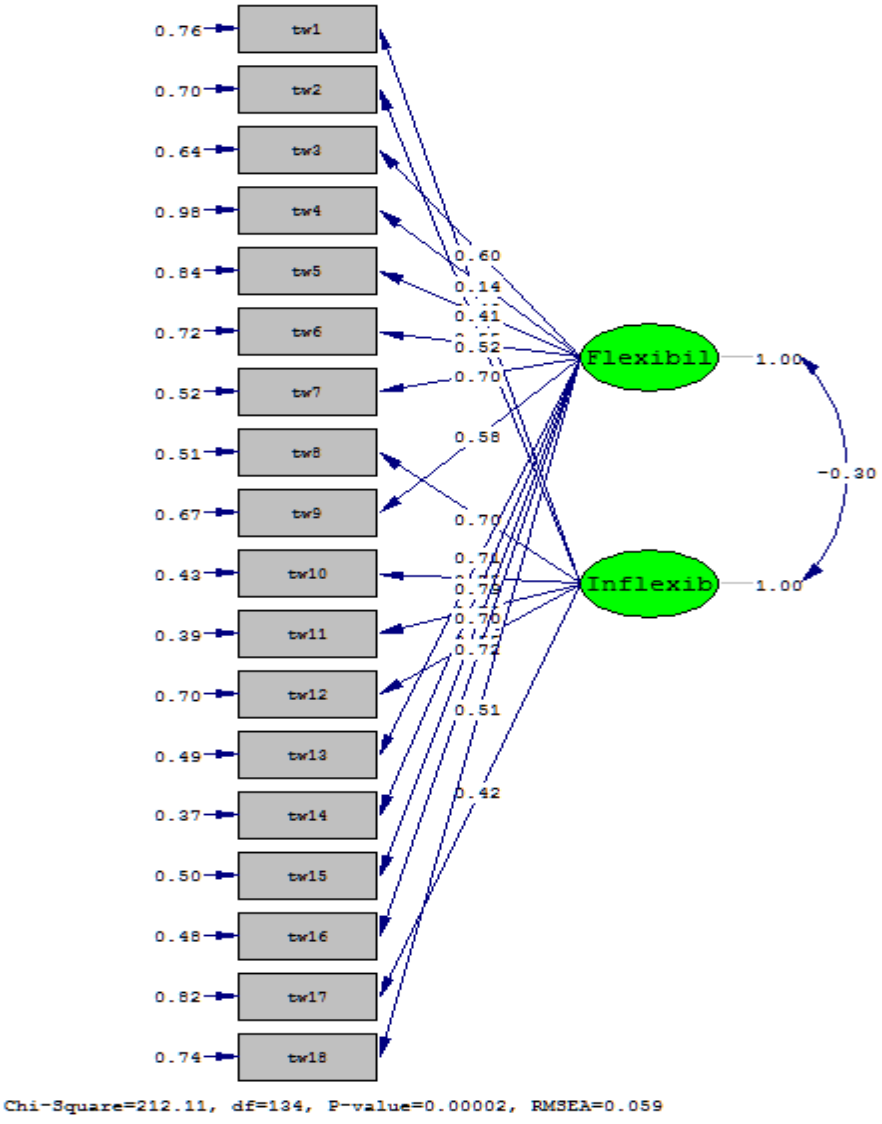
Appendix 1 . The graph of scale items on path coefficients



Appendix 2. Scale items

Subscale	Items
Flexibilty	3. My team involves every member in the decision-making process without any relevance to the national origin of a pair/group/team member.
	4. I work (in a pair/group/team work) with nationals from other countries differently from the way I work with people from my home country.
	5. I engage in a meaningful dialogue with people from other countries in the same way as with people from my own country.
	6. I acknowledge differences in communication and interaction styles when working with people from different countries.
	7. Working (in a pair/group/team work) with people from different cultures is exciting.
	9. Working (in a pair/group/team work) effectively with other people involves understanding other peoples' beliefs.
	13. When in another country, I try to learn as much about the culture of this country as possible.
	14. I am flexible when working i(n a pair/group/team work) with people from different cultures as I acknowledge differences in values and beliefs.
	15. I am comfortable when communicating with foreign nationals.
	16. Viewing people from their cultural perspectives is helpful when working on a multicultural pair/group/team.
	18. Creativity of the pair/group/team increases if people from different cultures are present.
Inflexibility	1. Establishing a good working (in a pair/group/team work) relationship with people from other countries is difficult.
	2. I feel uncomfortable working (in a pair/group/team work) with people from different countries.
	8. Dealing with cultural differences is a frustrating process.
	10. Hearing people speaking with an accent makes me believe that they are less capable.
	11. I am inattentive to cultural and behavioral norms of others.
	12. Effectiveness of communication on the pair/group/team falls when people from different countries are working on the team.
	17. I tend to develop closer relationships with pair/group/team members from my own country than with team members from other countries.

Appendix 3. Scale items (in Turkish)

Aşağıdaki maddeleri bir etkinlikte, çalışmada veya projede farklı kültürden, ülkeden, inançtan birey ya da bireylerden oluşan ikili grup (çift), küçük grup veya takım içinde olduğunuz durumları düşünerek cevaplayınız.

1. Diğer ülkelerden insanlarla iyi bir çalışma ilişkisi kurmak zordur.
2. Diğer ülkelerden insanlarla çalışmaktan rahatsızlık duyarım.
3. İçinde yer aldığım çalışma grubu ulusal kökenine bakmaksızın her üyesini karar verme sürecine dahil eder.
4. Diğer ülkelerin vatandaşlarıyla çalışırken kendi ülkemdeki insanlarla çalıştığımdan farklı bir şekilde çalışırım.
5. Kendi ülkemden insanlarla kurduğum iletişimin benzerini diğer ülkelerden gelen insanlarla da kurarım.
6. Diğer ülkelerden gelen insanlarla çalışırken iletişim ve etkileşim tarzlarında farklılıklar olabileceğini kabul ederim.
7. Diğer kültürlerden insanlarla çalışmak heyecan vericidir.
8. Kültürel farklılıklarla uğraşmak zorlayıcı bir süreçtir.
9. Diğer ülkelerden insanlarla etkili bir şekilde çalışmak diğer insanların inançlarını anlamayı gerektirir.
10. İnsanların aksanlı konuştuğunu duymak, onların daha az yetenekli olduklarına inanmama neden olur.
11. Diğer ülkelerden insanların kültürel ve davranışsal normlarını dikkate almam.
12. İkili grup veya takım içerisindeki iletişimin etkinliği, eğer üyeleri farklı ülkelerden gelen insanlardan oluşuyorsa düşer.
13. Başka bir ülkedeyken, o ülkenin kültürü hakkında mümkün olduğunca çok şey öğrenmeye çalışırım.
14. Değerler ve inançlardaki farklılıkları kabul ettiğim için farklı kültürlerden insanlarla çalışırken esneğimdir.
15. Yabancı uyruklu kişilerle iletişim kurarken rahatımdır.
16. Çok kültürlü bir ikili grup veya takım içerisinde çalışırken farklı kültürel bakış açılarını anlamak ve aynı zamanda bir konuyu değerlendirirken bu bakış açılarından faydalanmak gerekir.
17. Kendi ülke vatandaşlarımdan oluşan grup üyeleriyle diğer ülkelerden oluşan grup üyelerine göre daha yakın ilişkiler kurma eğilimindeyimdir.
18. Eğer grup üyeleri farklı kültürlerden gelen insanlardan oluşuyorsa o grubun yaratıcılığı artar.

Note:
In the present study, English version of the scale is used however, it is translated into Turkish language in order to help and support researchers who will conduct further studies on multi-cultural teams in educational settings.