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Measurement Invariance and Construct Validity of the Turkish Version of the Learner Autonomy Scale in a Sample of High and Secondary School Students

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Abstract
The aim of this research is to adapt the 24-item "Learner Autonomy Scale" developed by Sereti and Giossos (2018) in higher education samples into Turkish by examining the psychometric properties of high school and secondary school samples, and to determine whether these groups are equivalent in terms of measurement invariance. The scale was applied in high school (n = 475) and secondary school (n = 395) samples consisting of 870 students. Different from the original four-factor scale form, EFA applied to both groups revealed a two-factor (factor load range: .308-.775) and 21-item. Correlation values (r = .209-.392, p<.001) indicate that the factors are not strongly related. The factors produced adequate internal consistency coefficients (α = .706-.866; ω = .708-.871) and were validated by meeting the fit indices accepted in the literature for CFA. Measurement invariance tests revealed strong invariance for the structural and metric tests and partial invariance for the scalar test in high school and secondary school samples. More research is needed to determine why the intersections of items 19, 20, and 21 are not invariant. The main contribution to "learner autonomy" in this study is the adaptation and justification of a valid and reliable measurement tool for determining autonomy in the adolescent age group. The use of the adapted scale in different educational environments and in the examination of "autonomy" by adapting it specific to the field (science, mathematics, etc.) will provide important implications for further theoretical studies.

Keywords: Autonomy, Learner autonomy, Measurement invariance, Scale adaptation

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Introduction

Learner autonomy, which is closely related to the concept of learning and defined as the individual's ability to recognize and know his or her own qualities, manage learning tasks based on internal approval, and reach the information sources he or she is curious about beyond the classroom boundaries, is an important component in the construction of 21st century skills. "Learner autonomy," which is an indispensable component of a successful learning process, is defined as an experiential process in which students take responsibility for their own learning by exercising control over all stages of the educational process (Little, 2004; Moore, 1993; Oxford, 2008). In the design of autonomous learning environments, educators have developed measurement tools to determine autonomy in samples overwhelmingly selected from higher education levels. Along with the development of technological tools and their use as auxiliary resources in reaching the target achievements, the widespread use of distance education platforms and the increasing emphasis on learning tasks outside the classroom bring up the necessity of supporting high school and secondary school students as "autonomous learners."

In this study, it was aimed to test the validity and reliability of the "Learner Autonomy Scale" (LAS) developed by Sereti and Giossos (2018) to be used in a context where distance and face-to-face education are used together in higher education in high school and secondary school student samples in Türkiye. The article begins with a review of the literature on learner autonomy. Then, the steps in adapting and validating the scale are explained in detail. The article then moves on to report the measurement invariance of the scale between high school and secondary school groups. The findings were discussed in light of the literature, and the article was concluded.

Literature Review

The concept of "autonomy" is defined as the "ability to take responsibility" in which learners study completely on their own and perform the tasks necessary for their own learning (Holec, 1981, p. 3). In other words, autonomy basically involves students taking personal initiative to engage in learning, find resources and opportunities for learning, and persist in learning (Ponton, Carr, & Confessore, 2000). According to Nunan (1997), autonomy is considered a step in which students actively participate in the preparation of curriculum content and teaching activities. Oxford's (2008) view of autonomy implies "the processes by which learners make decisions that involve both planning and execution in a fully autonomous learning environment." "Autonomous learning," which is used in different disciplines and defined as self-management in the early literature (Long, 1989), more specifically means that the student has the ability to decide what and how to learn. The autonomous student actively manages the learning processes, recognizes and evaluates learning needs, tries to shape their goals, plans the learning content, controls the learning task, and finally evaluates them (Little, 2004).

Willis (2011) argues that, when learning is perceived as a shared responsibility of teachers and students, autonomy is more likely to be achieved in that classroom setting. In addition to materials produced only by teachers, students' ability to break down barriers with the classroom and the world beyond by producing their own study resources not only improves their autonomy but also encourages their creativity. Thus, a learning environment limited to predetermined materials leaves its place for an authentic and selective environment. In addition, the use of new technologies, especially the internet, in learning has increased the importance of keeping these tools under the control of their users, or, in other words, "autonomy." Increasing distance education services, in parallel with developments in technology, have led the subject of learner autonomy to take place on the agenda of theoretical and empirical research (Guven & Sunbul, 2007; Maryorita & Maay, 2023; Vasiloudis et al., 2015). The fact that student-teacher association is not an absolute necessity in distance education creates a learning environment based on student autonomy (Giagli, Giaglis, & Koutsouba, 2010; Pratiwi & Waluyo, 2023).

Theoretical approaches to learner autonomy define "autonomy" as a self-management ability or a psychological state (Anderson & Dron, 2011; Chen, 1983; Garrison, 2000; Merriam & Caffarella, 1999; Zimmerman & Schunk, 1989). The student's ability to manage how and what to learn is related to the amount of responsibility the student is willing to take for his or her own learning, which clearly reflects the needs of autonomous learning. Psychological disposition is defined as the attitude towards and taking responsibility for how and what the student will learn.

In the literature, the most commonly used scales for learner autonomy developed in the field of education are as follows: Guglielmino's (1977) self-directed learning readiness scale; Fisher, King, and Tague's (2001) self-directed learning readiness scale for nursing education; Chen's (2001) student autonomy scale; Walker and Fraser's (2005)

distance education learning environments scale (DELES); Bekker and Van Assen's (2006) autonomy-commitment scale (ACS-30); Macaskill and Taylor's (2010) autonomous learning scale; Bei, Mavroidis, and Giossos's (2019) distance education student autonomy scale; Bei (2016) and Zhang and Li's (2004) learner autonomy scale. Scales targeting learner autonomy were applied in different populations (university, adults, etc.) and social contexts (face-to-face or distance).

Studies centered on "learner autonomy," focused on correlational relationships between configurations related to autonomy (Someya & Obermeier, 2023) and teachers' perceptions of learners (Doğan &Mirici, 2017; Lamb, 2011; Mirici, Galleano & Torres, 2013; Shahsavari, 2014), supporting autonomy in EFL students (Meri-Yılan, 2023) components that are effective in the development of autonomy (Chwo, 2011; Kristmanson, Lafargue, & Culligan, 2013; Özer & Yükselir, 2021; Udosen, 2014), autonomous learning environments (Aminah, Maulida, & Supriadi, 2023; Benson, 2001; Khonen, 2012), integration of autonomy into the classroom environment (Ahmadianzadeh et al., 2020; Shih, 2020; Tran, 2020), teacher roles (Borg & Al-Busaidi, 2012; Susanti, Rachmajanti, & Mustofa, 2023; Yıldırım, 2012), teaching practices that support autonomy (Course, 2017; Doğan & Mirici, 2017; Lenkaitis, 2020; Şener & Mede, 2023; Vázquez, 2018), factors that hinder learner autonomy (Basri, 2023).

Although scales for learner autonomy have been developed, it is not convenient to use these scales specific to a single context or age group because they target different contexts and samples. Most research has been done on the processes involved in facilitating autonomous learning rather than on the properties of autonomous learners. Rather than measuring autonomous learning directly, research has tended to measure configurations associated with autonomous learning, such as learning motivation and perceived efficacy. This may explain the lack of measurements.

Most of the studies on learner autonomy have been carried out in the context of language learning and with age groups at higher education levels. The situation where the development of autonomous learners is one of the main aims of university education (Bryde & Milburn 1990; Chemers et al. 2001; Ciekanski, 2007; Stephenson & Laycock 1993), and the support in these educational institutions (Baharom & Shaari, 2022; Gocić & Janković, 2021; Griffiths & Dikilitaş, 2022; Lien, 2022; Nhung & Yen, 2022; Phuong, Huy, & Lich, 2023), has become widespread with the development of distance learning tools. It is possible to observe similar developments in the education of the adolescent age group. Indeed, the studies conducted (Dubois, Guay, & St-Pierre, 2023; Faizah et al., 2023; Großmann et al., 2023; Kleinkorres, Stand-Rabrig, & McElany, 2023; Stevani & Ginting, 2022) reflect the increasing emphasis on the autonomy of high school and secondary school age groups.

Students should be encouraged to be independent learners outside the classroom. The rapid developments with the emergence of COVID-19 and the natural disasters that followed (for example, the earthquakes in Türkiye on February 6, 2023) have dragged individuals into unexpected situations with effects at all levels. In this process, while the MoNE is trying to compete with the urgent need for distance education, it has made available various platforms and digital tools for students and teachers. This process, which aims at distance learning, has increased the importance of student autonomy. Therefore, it is reasonable to argue that distance education applications, which have become widespread in higher education, will be a permanent part of the education of adolescent students. Otherwise, not providing students with sufficient autonomy may lead to consequences that hinder learning and undermine their motivation to learn (Le & Jia, 2022). It is therefore important to develop or adapt tools to help assess the characteristics of autonomous learners.

The use of a scale targeting high school and secondary school age groups is not common. In this respect, the learner autonomy scale adapted to high school and secondary school age groups can limit the problems related to the use of other scales targeting autonomy. In this age group, a "generic scale" specially designed or adapted to measure what is understood as autonomous learning is thought to be useful for research in the field. Therefore, adaptation of the scale seems appropriate for a specific context. Testing the LAS in high school and secondary school age groups provides additional opportunities to examine the possibility of generalizability across different age segments as it identifies the response patterns of students in distant age groups.

Purpose of the Study

The current research is designed to test the psychometric properties of a "self-report tool" developed to assess higher education students' autonomy levels in groups of high school and secondary school students. In this direction, the goal of the research is to adapt the LAS developed by Sereti & Giossos (2018) into Turkish by conducting a validity and reliability study. For this purpose, the following hypotheses were tested:

H1: The factorial construct of LAS represents a two-factor construct in line with the literature.

H1a: The factorial construct of the LAS obtained from the high school group represents a two-factor construct.
H1b: The factorial construct related to the LAS obtained from the secondary school group represents a two-factor construct.
H2: The LAS, adapted to determine students' autonomy levels, is reliable.
H2a: The reliability coefficients obtained from the high school group are within acceptable limits.
H2b: The reliability coefficients obtained from the secondary school group are within acceptable limits.
H3: The factorial construct of the LAS is equivalent in high school and secondary school groups in terms of measurement invariance.

Method

Research Design

This research was conducted based on the relational screening model. Differences between groups are examined according to the variable states determined in relational screening models (Karasar, 2005).

Population and Sample

By using a random method, the sample of this study was selected from volunteer students studying at public secondary and high schools in Artuklu district of province Mardin. The schools where the research will be conducted were selected with the guidance of maximum diversity sampling, which is among the purposeful sampling methods. According to Patton (2002), purposeful sampling provides the opportunity to examine in detail situations that contain comprehensive information. Maximum diversity sampling is the creation of a sample from different situations that are similar within themselves regarding the problem (Büyüköztürk et al., 2017). For this purpose, a total of 600 students studying at 4 secondary schools and 3 high schools were included in the EFA group; 270 students were included in the CFA group. Information reflecting the participants is summarized in Table 1 below.

Table 1. Participant characteristics

	Characteristic	**N**				**%**			
		School Grade							
		High School		Secondary School		High School		Secondary School	
	Gender	EFA	CFA	EFA	CFA	EFA	CFA	EFA	CFA
	Female	180	62	124	73	59,2	47,7	55,8	52,2
	Male	165	68	131	67	40,8	52,3	44,2	47,8
	Total	345	130	255	140				
Secondary School	**Grade Levels**								
	5th grade			79	38			26,7	27,0
	6th grade			66	32			22,3	23,0
	7th grade			72	34			24,3	24,0
	8th grade			79	36			26,7	26,0
High School	9th grade	76	34			25,0	26,0		
	10th grade	68	30			22,4	23,0		
	11th grade	77	39			25,3	30,0		
	12th grade	83	27			27,3	21,0		

According to the participant information in Table 1, it is seen that the total of high school students is 345 (female = 180; male = 165) for EFA and 130 (female = 62; male = 68) for CFA, and that the total of secondary school students is 255 (female = 124; male = 131) for EFA and 140 (female = 73; male = 67) for CFA. In the EFA group in the high school sample, it is understood that there is a distribution of 25% in the 9th grade, 22.4% in the 10th grade, 25.3% in the 11th grade, and 27.3% in the 12th grade; and for the CFA group, there is a distribution of 26% in the 9th grade, 23% in the 10th grade, 30% in the 11th grade, and 21% in the 12th grade. In the EFA group in the secondary school sample, there is a distribution of 26.7% in 5th grade, 22.3% in 6th grade, 24.3% in 7th grade,

and 26.7% in 8th grade; and in the CFA group, there is a distribution of 27% in 5th grade, 23% in 6th grade, 24% in 7th grade, and 26% in 8th grade.

Data Collection Tools

The original scale was tested on a sample of 258 undergraduate and graduate students. In the EFA process conducted within the scope of construct validity, a 24-item and 4-factor construct was decided. Scale dimensions are listed as “Special Self-Management Ability” (8 items), “Special Psychological Tendency” (6 items), “General Self-Management Ability” (7 items), and “General Psychological Tendency” (3 items). The first factor explained 22.84% of the variance, the second factor explained 9.13% of the variance, the third factor explained 7.06% of the variance, and the fourth factor explained 6.36% of the variance. The Cronbach's alpha value for the whole scale was calculated as .85, and for the subscales as .82, .65, .76 and .48, respectively. Robinson et al. (1991) suggest that in EFA applied for exploratory purposes, values below .70, which is the accepted lower limit for Cronbach's alpha, can also be accepted.

Data Collection

The scale was distributed to the students after the necessary permission was obtained from the Mardin National Education Provincial Directorate. During the data collection process, the researchers gave the students information about the purpose, duration, and confidentiality of the research. The students were reminded that their participation in the research is voluntary, and written consent was obtained from the students. This study was approved by the Ethics Committee of the Fırat University Institute of Educational Sciences.

Procedure/Process

Depending on the purpose of the study, the scale's adaptation to Turkish, validity, and reliability procedures were carried out, respectively.

Adapting to Turkish

In the first stage, within the scope of the research, the scale was translated into Turkish by 2 English teachers and 1 psychological counselor, taking into account the criteria of the International Testing Commission (Hernández et al., 2020). The examination of the form created from the obtained translations in terms of suitability for high school and secondary school students and the language was carried out by a Turkish teacher. In line with the suggestions reached in terms of context and linguistics, the final form was created.

In the second stage, the back translation of the scale was done by an English teacher and an educational sciences expert. In order to examine the consistency between the new English form created and the original form, the opinion of one lecturer in the School of Foreign Languages was taken. The experts consulted are scientists who work both on the subject being measured and in the field of scale development. Although the necessity of obtaining opinions from at least three experts is discussed in the literature (Yusoff, 2019), the number of experts on the subject on which the problem of this research focuses is two. In line with the opinions obtained from the experts, relevant corrections were made, and the scale was made ready to use.

Validity

Regarding construct validity, EFA and CFA were conducted for both high school and secondary school "scale" forms. Using CFA after EFA is a widely accepted method in construct validity studies (Worthington & Whittaker, 2006).

Exploratory Factor Analysis (EFA): EFA provides a number of tools to analyze the construct of relationships among many variables by identifying sets of highly correlated variables known as factors (Hair et al., 2014, p. 92). It is common to use EFA in scale development studies and CFA in scale validation studies. The use of CFA alone is based on systematic results and theoretical assumptions. Exploratory EFA can be used in scale validation studies when new predictions about the number and relationships of factors are available (Izquierdo, Olea, & Abad, 2014). In this adaptation study, the original scale with four sub-dimensions was hypothesized to have two sub-dimensions, in line with previous empirical findings.

Regarding the high school and secondary school scale forms, before EFA was performed, the "power to represent the whole" and "discrimination" of the items in the scale were calculated as item-total correlation. Items showing

item-total correlation with a cut-off value of .30 and above were included in the analysis. Then, the Bartlett Sphericity test and the Kaiser-Meyer-Olkin (KMO) test were performed to determine the suitability of the data for factor analysis (Tavşancıl, 2010). The suitability of the data for factor analysis is determined by the fact that the KMO coefficient is at least 0.60 and the Bartlett test is significant (Çokluk, Şekercioğlu, & Büyüköztürk, 2018).

Principal component analysis was chosen as the factorization technique. Principal component analysis is used when it is aimed at summarizing most of the original information (variance) with a minimum number of factors (Hair et al., 2014). According to Brown (2006), the researcher can apply axis rotation to the factors obtained as a result of factor analysis. Thus, highly correlated items can be easily interpreted by grouping them under certain factors.

It was decided to distribute the factor loads using the Promax rotation method. In this oblique rotation method, the correlation of factors is allowed (Tabachnick & Fidell, 2015). In factor subtraction, values with an eigenvalue of 1 and higher were considered important components. In this study, the cut-off value determined for the factor load value was determined as .30, taking into account the coefficient ranges adjusted for the sample number of Hair et al. (2014). Among the overlapping (cross) items loaded on more than one factor in the draft scale, those that were above the tolerance value (.10; Tavşancıl, 2010) were excluded from the analysis, respectively, and the factor analysis was repeated (Çokluk et al., 2018).

Tabachnick and Fidell (2015) suggest a holistic evaluation of the eigenvalue, the contribution amount to the total variance, and the scree plot to decide the total factor number of the scale. In addition, in light of previous empirical findings, it is suggested that the researcher can use the previously determined number of factor constraints (Hair et al., 2014). Parallel analysis findings proposed by Pallant (2020) were added as a reference point to the set of criteria followed in determining the number of factors. When deciding on the final number of factors, the risk of too many factors creating interpretation difficulties was taken into account.

Confirmative Factor Analysis (CFA): CFA is applied to test the extent to which the a priori factor loading model on predetermined configurations represents the real data (Hair et al., 2014, p. 603). In a sense, CFA is a tool that provides verification of theory-based assumptions.

In order to evaluate the fit of the measurement model designed within the scope of CFA, the fit indices recommended by Kline (2019, p. 270) and accepted as a guide in this study were examined and interpreted (values were considered good fit 3 and below). For $\chi 2/df$; .10 and below for RMSEA; .90 and above for CFI; .85 and above for GFI; .10 and below for SRMR.

Reliability

In this study, Cronbach's alpha and McDonald's omega were used to evaluate the internal consistency of the scales. Additional reliability coefficients were also considered in this study. In this context, the reliability measure derived from CFA was used. This is referred to as composite reliability (CR). For CR calculated by the Fornell and Larcker (1981) technique, values of .7 and above mean good reliability.

Measurement Invariance

Measurement invariance, or equivalence, tests whether measurements provide results with the same characteristics (Horn & McArdle, 1992, p. 117). This is considered a crucial step for group comparison studies, as measurement invariance indicates whether different group members interpret scale items based on similar response patterns (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). In addition, measurement invariance provides additional evidence for construct validity (Van de Schoot, Lugtig, & Hox, 2012).

Measurement invariance is tested at least at three incremental levels from a psychometric perspective (Chen, 2007; Asparouhov & Muthén, 2014): configural invariance, metric invariance, and scalar invariance. Configurational invariance refers to whether the same number of latent configurations characterized by the same items fit equally well with the data across groups. Metric invariance is tested when configural invariance is met. Metric invariance adds the restriction that the relationship between hidden constructs and items must be equal across groups. If metric invariance is not achieved, it turns out that different student groups interpret the items in different ways. Another level of measurement invariance is scalar invariance, which indicates that students with the same implicit construct

choose the same response options for the same items. Once the scalar invariance is met, the researcher has the opportunity to compare the implicit factor means, variances, and covariances between groups.
The results were interpreted according to the $\chi 2$, CFI, and RMSEA indexes. $\chi 2$ values are sensitive to sample sizes and the number of groups (Hair et al., 2014). Therefore, CFI and RMSEA are considered stronger indicators. Cheung and Rensvold (2002) and Rutkowski and Svetina (2014) determined cut-off values of $-0.01 \leq CFI \leq 0.01$ and $RMSEA \leq 0.10$ as criterion criteria. In this study, the cut-off values suggested by the aforementioned researchers were followed.

Data Analysis

IBM SPSS 22 and AMOS 24 programs were used in the analysis of the data. In the measurement invariance analysis, "multi-group confirmatory factor analysis" (MG-CFA), which is the most frequently used test technique, was used (Bryne, 2010; Millsap, 2011). The ultimate goal of MG-CFA is to compare implicit factor means, variances, and covariances between groups after controlling for measurement errors. Analyses were performed after examining whether the data set and data structure met the assumptions required by univariate and multivariate statistical methods. In the analyses carried out within the scope of EFA, it was observed that 8 observations in the high school group and 11 observations in the secondary school group consisted of missing data, and in the CFA group, 3 observations in the high school group and 5 observations in the secondary school group were found to be missing data. After it was determined that these data were randomly distributed, the mean of the series was assigned to replace the missing data. Among the Z scores calculated to detect univariate outliers, those exceeding ± 3 criterion values were excluded from the analysis (Johnson & Wichern, 2007).

Findings

Preliminary Analyzes

A preliminary analysis of the metric quality of the items was conducted to apply EFA to the most appropriate items representing the scale. In order to determine the representativeness and distinctiveness of the scale items as a whole, the item-total correlation was examined using the Pearson correlation coefficient. If the total test correlation of the items is low (<.3), it is stated that the item measures a different quality than other items (Büyüköztürk, 2014; Hair et al., 2014). It is desired that the correlation value between items be higher than .3 (Pallant, 2020). According to the analysis results performed on both high school and middle school samples, item-total correlation coefficients ranging between .34-.56 for the high school group and .31-.59 for the middle school group were obtained. Inter-item correlation values range between .32-.59 for the high school group and .31-.55 for the secondary school group.

The t-test analysis results performed according to the average of the lower and upper groups revealed that each item was significant at the $p<.001$ level between the groups in the high school and middle school samples. The regression analysis performed to predict the total score of each item produced significant F values at the $p = .00$ level for all items in both samples.

Findings Concerning the Validity Study

Under this heading, findings related to EFA and CFA are included.

Findings Related to EFA

EFA findings for high school and secondary school groups were reported together. Bartlett's test of sphericity for high school and secondary school groups (High School: $\chi 2 = 1813{,}948$, $df = 210$, $p = .000$; Secondary School: $\chi 2 = 2216{,}896$, $df = 276$, $p = .000$) and Kaiser-Meyer-Olkin's measure of sampling adequacy (High School: KMO = .863; Secondary School: KMO = .896), reveal the factorability of the correlation matrices of the scale in both groups. The eigenvalue and the contribution amount to the total variance of both samples are presented together in the table below.

Table 2. EFA and reliability test results for high school and secondary school samples

High School											Secondary School										
		Unrotated Factor Matrix					Rotated Factor Matrix (Promax)					Unrotated Factor Matrix					Rotated Factor Matrix (Promax)				
		Components					Components					Components					Components				
Items		1	2	3	4	Items	Self-Management	Psychological Tendency		Communality	Items	1	2	3	4	Items	Self-Management	Psychological Tendency		Communality
5		**,693**				5	,727			,523	16	**,681**				4	,713			,462
18		**,669**				7	,679			,458	7	**,677**				5	,700			,443
17		**,657**			,385	8	,670			,437	1	**,659**				2	,689			,465
16		**,656**				18	,649			,444	2	**,650**				7	,677			,486
6		**,640**				17	,648			,434	6	**,649**				3	,668			,397
7		**,639**				2	,646			,411	4	**,620**			,315	8	,666			,406
1		**,630**				6	,644			,426	17	**,620**			-,324	16	,654			,471
8		**,627**			-,336	1	,640			,420	18	**,612**				1	,599			,446
2		**,618**				16	,637			,421	5	**,610**				6	,597			,434
4		**,574**			-,405	4	,611			,366	8	**,578**				17	,587			,392
20		**,506**				3	,571			,311	3	**,569**				18	,550			,374
3		**,500**				24	,529			,318	12	**,506**	,379			24	,443			,314
24		**,479**			,392	20	,457			,306	22	**,487**		,392		19	,384			,324
21		,395		,373	,392	19	,374			,342	24	**,425**				20	,377			,323
23		,393				12			,775	,614	23	,397	,345			22	,308			,329
19		,363				11			,761	,591	11	,370	**,591**			11			,724	,485
12		,357	**,695**			9			,704	,483	13	,350	**,562**			13			,709	,461
11		,344	**,680**			13			,611	,429	14		**,482**			14			,642	,368
9			**,638**			10			,561	,311	10		**,404**		,365	12			,608	,463
13		,390	**,537**	-,415		22			,495	,307	9		,395		,369	9			,504	,349
22			,449	,447		14			,403	,314	19			**,543**		10			,498	,331
14			,357	**-,584**							20	,317		**,480**	**,402**					
10			**,539**	**,543**							21			**,476**						
15		,306		,470							15			,389	-,379					
	PCA	5,594	2,581	1,402	1,080		5,594	2,581				PCA	6,008	2,037	1,436	1,189	5,766	1,937		
Factor Eigenvalue	PA	1,558	1,467	1,435	1,340						Factor Eigenvalue	PA	1,614	1,513	1,508	1,373				
Total Variance	%						26,639	12,289			Total Variance	%					27,459	9,222		
	% (Cumulative)						38,928					% (Cumulative)					36,681			
Reliability	Alpha (α)						,866	,728			Reliability	Alpha (α)					,851	,706		
	Omega (ω)						,871	,739				Omega (ω)					,862	,708		

Note: "PCA": Principal Component Analysis
"PA": Parallel Analysis

According to Table 2, when the unrotated factor matrices in the high school and secondary school groups are analyzed for four components as in the original scale, it is seen that high factor loads are listed under two

components while some factor loads are loaded crosswise. Scree Plots for high school and secondary school samples are presented in Figure 1 below.

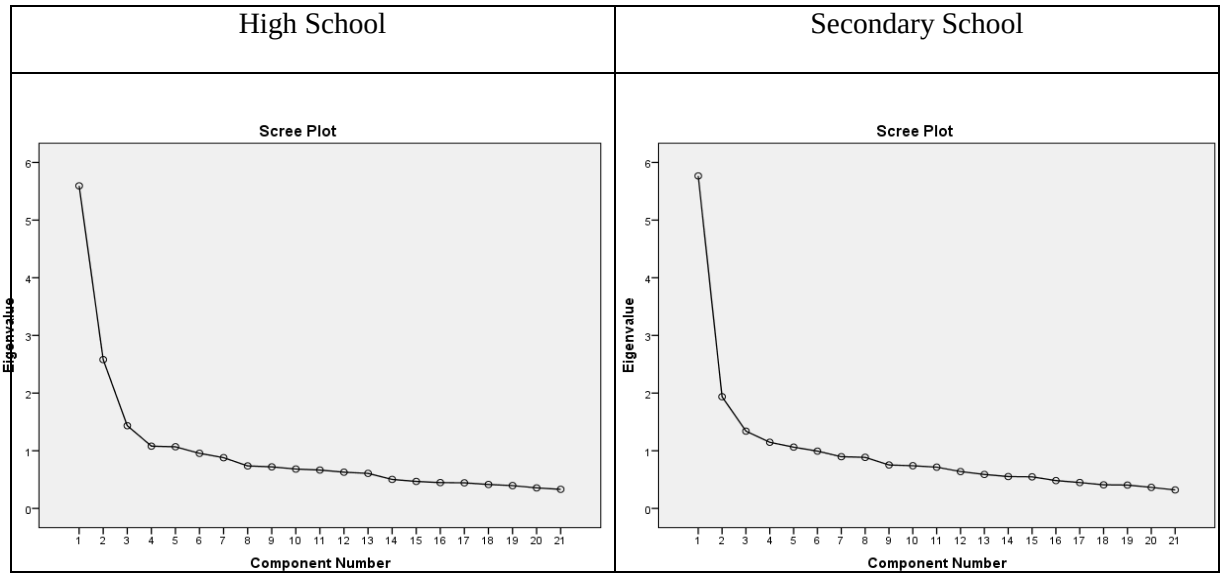


Figure 1. Scree plot for high school and secondary school samples

In order to determine the optimum number of factors, when the Scree Plot of both samples (Figure 1) is examined, it can be said that there is a fairly clear break between the 1st and 2nd components and that there is a clear break between the 2nd and 3rd components. Items 15, 21, and 23, which were cross-loaded during Promax rotation and contributed weakly to the common variance, were excluded from the analysis. As a result of this process, the number of items in the original scale form decreased from 24 to 21. Factor loads were gathered under two components for both groups. Thus, it can be said that the H1-coded hypothesis is supported.

The factor loads of the high school group ranged from .374 to .775 and explained 38.928% of the total variance; the factor loads of the secondary school group varied between .308-.724 and explained 36.681% of the total variance. The Parallel analysis proposed by Pallant (2020) was used as an additional way to support the two-factor analysis. While deciding on the number of factors to keep, if the initial eigenvalues obtained with SPSS are greater than the criterion values obtained from the Parallel analysis, the relevant factors are preserved, but if they are lower, they are rejected. Parallel analysis results in Table 2 support the idea that only two factors should be preserved. The absolute threshold of explained variance has not been adopted by some researchers (Hair et al., 2014, p. 107). Cliff (1987) suggests that increasing the explained variance causes extraneous variables to overlap. A large number of factors not only provide opportunities to increase the level of variance explained but also make the evaluation of the structure difficult. However, it causes the unique variance and error variance to inflate. In the literature, deciding the final number of factors is left to the researcher (Hair et al., 2014; Tbachnick and Fidell, 2015) In this research, the number of factors was decided by combining conceptual foundations and empirical evidence with the set of criteria envisaged for EFA. The two factors were labeled as "Self-Management" and "Psychological Tendency" which are frequently used in the literature, adhering to the concepts of "Special Self-Management" and "Special Psychological Tendency" in the original scale form. Correlations between factors are presented in the table below.

Table 3. Correlation coefficients between factors

Subscale		**1**	**2**
1	Self-Management	1	
2	Psychological Tendency	.209** (.392**)	1

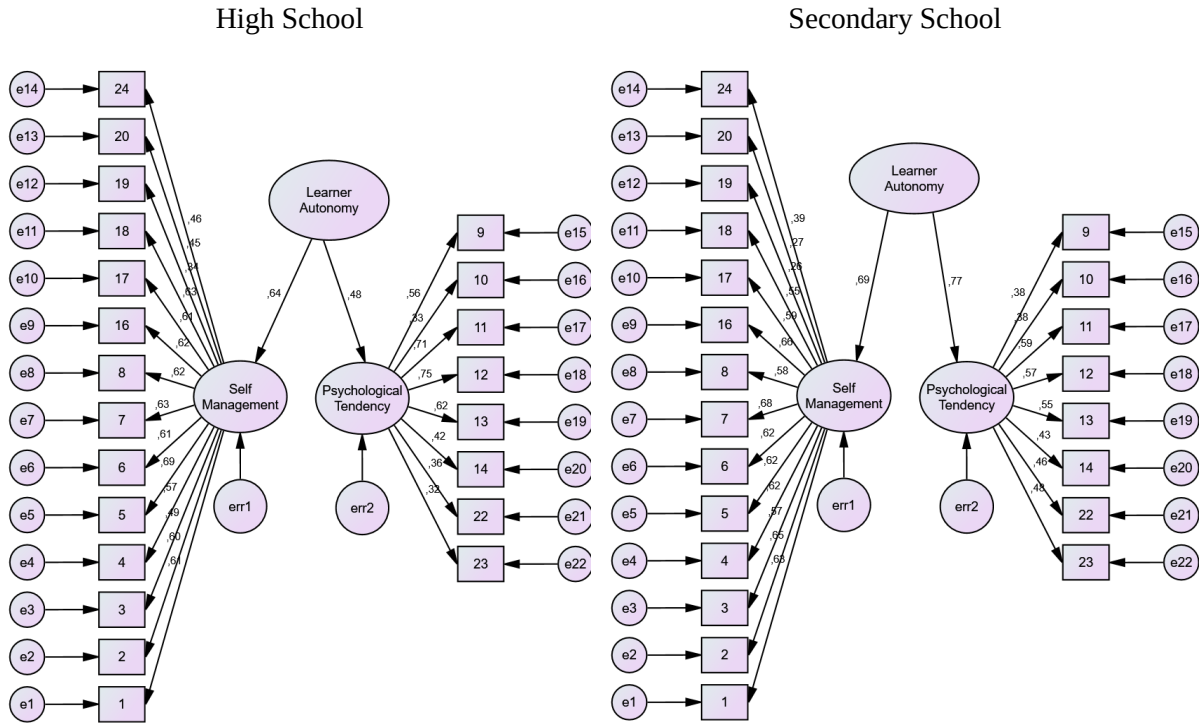
**p<.001

Note: The value before the parenthesis reflects the high school sample, and the value in the parenthesis reflects the secondary school sample. The purpose of presenting the correlation matrix in the table is to show the strength of the relationship between two factors. While no relationship may be found, a very high level of relationship may also be obtained (Pallant, 2020, p. 219). Inferences can be made by evaluating the predictions regarding theoretical concepts and the exploratory function of EFA together. As suggested in the literature (Anderson and Dron, 2011; Chen, 1983; Garrison, 2000; Merriam and Caffarella, 1999; Zimmerman and Schunk, 1989), self-management and

psychological tendencies can be considered under the umbrella of autonomy. However, they can also be examined as different factors.
The correlation values presented in Table 3 show that the extracted factors are not strongly related and can be identified independently.

Findings Related to CFA

The CFA findings conducted for high school and secondary school groups are presented together in Figure 2.



First-order CFA results	
CFA: λ = .32-.75; χ^2 = 480,862; *df* = 208; $\chi 2/df$ = 2,312; CFI = .842; GFI = .866; RMSEA = .67; SRMR = .714.	CFA: λ = .27-.68; χ^2 = 386,796; *df* = 208; $\chi 2/df$ = 1,860; CFI = .862; GFI = .876; RMSEA = .59; SRMR = .643.
σ^2 (%): Self-Management = .42; Psychological Tendency =.73	σ^2 (%): Self-Management = .40; Psychological Tendency =.32
CR: Self-Management = .871; Psychological Tendency = .742	CR: Self-Management = .861; Psychological Tendency = .717
Second-order CFA results	
χ^2 = 480,658; *df* = 207; $\chi 2/df$ = 2,332; CFI = .844; GFI = .867; RMSEA = .67; SRMR = .715.	χ^2 = 386,331; *df* = 207; $\chi 2/df$ = 1,866; CFI = .863; GFI = .878; RMSEA = .59; SRMR = .646.

Figure 2. Standardized path diagrams reflecting high school and secondary school groups and CFA results

Figure 2 shows the path diagrams of the CFA and the refined fit indices for both samples. Except for that, four items in the high school group and five items in the secondary school group produced results below the criterion value (λ < .50) suggested by Fornell and Larcker (1981); it can be said that the fit indices reflecting the data of both samples are at an acceptable level. Regarding the factor-load value ranges, the fact that λ < .50 adversely affects the average variance extracted (AVE) ratio is related to convergent validity. Regarding this, Fornell and Larcker (1981) state that the convergent validity of a construct with a load value of less than 0.50 but a composite reliability coefficient (CR) higher than .7 is still sufficient. The CR performed to calculate the construct reliability of the factors validated in the refined models shows that sufficient coefficients (>.7) are obtained. In both samples, the items loaded on the relevant factors significantly (p<.05). Therefore, unlike the original scale form, which was defined as having four sub-dimensions, the scale was confirmed to have two sub-dimensions supporting hypotheses H1a and H1b.

It was tested whether there was a significant decrease in the second-order CFA model fit compared to the first-order model (Brown, 2006). The obtained chi-square difference values (.18, p>.05 for the high school sample; .30, p>.05 for the secondary school sample) did not cause a significant decrease in the fit values of the second-order model application compared to the first-order model. Therefore, this finding supports the defensibility of the second-order model.

While the explained variances (σ^2) reflected a similar coefficient between the groups in terms of the Self-Management dimension, they revealed a difference of .41 in terms of the Psychological Tendency dimension. To investigate whether this finding was due to differences between groups, estimation of measurement invariance was used.

Findings on Reliability

Cronbach alpha (α = .706-.866) and McDonald omega coefficients (ω = .708-.871), are supporting the H2 coded hypothesis and reflect that the scale produces a desired level of internal consistency coefficient in high school (H2a) and secondary school (H2b) groups. CR, which was applied additionally at the CFA stage, revealed coefficients above the cut-off value of .7 in the high school and secondary school groups.

Results of Measurement Invariance Between High School and Secondary School Samples

In order to test whether the recently created original measurement tool has the same psychometric properties between high school and secondary school groups in Türkiye, measurement invariance was performed, and the relevant analysis results are presented in the table below.

Table 4. Measurement invariance results for high school and secondary school groups

Model	**General Fit Indices**				**Model Comparison**	**Comparative Fit Indices**				
	$\chi2$ (df)	CFI	RMSEA	SRMR		$\Delta\chi2$	Δdf	ΔCFI	ΔRMSEA	p
1. Configural	867,651 (416)	.851	.045	.071	-	-	-	-	-	-
2. Metric	890,310 (436)	.850	.044	.071	2 vs. 1	22,659	20	.001	0,001	.305
3. Scalar	994,163 (456)	.822	.047	.074	3 vs. 2	103,853	20	.028	0,003	.000

At each step of measurement invariance, the aforementioned constraints remained in effect. First, configural invariance was tested. According to Table 4 information reflecting invariance models (configural, metric, and scalar), it can be said that the model fit required by configural invariance is within acceptable limits. At this stage, factor loadings, inter-factor correlations, and error variances were allowed to be freely estimated between both groups. Secondly, the metric invariance test was performed by limiting the factor loads to be equal between levels. Since the comparative fit indices (CFI and RMSEA) between the configural and metric models meet the specified criteria values ($-0.01 \leq CFI \leq 0.01$ and $RMSEA \leq 0.10$), it can be stated that metric invariance is achieved. Therefore, it can be said that high school and secondary school students answered the scale items in a similar way. Finally, scalar invariance was tested by setting the residual variance across levels to 0.

When the differences between the fit indices obtained from scalar invariance and the fit indices obtained from metric invariance are examined (CFI = .028), it is understood that the model does not provide the cut-off values determined for scalar invariance. In other words, the results showed poor fit with the data. The source of the invariance was searched using the change indices of the scalar invariance model. Then, the parameter of the largest change index is stretched one by one (a free estimate). After the relevant parameters were stretched, the model was re-run, and this process was repeated until none of the modification index values were statistically significant (Yoon & Kim, 2014). After analyzing the differences between the intersection points of the metric and scalar models, a significant difference was observed regarding items 19, 20, and 21. This means that the three items have non-invariant intersections. Therefore, partial scalar invariance is provided by releasing the restriction on items 19, 20, and 21. Thus, it was possible to compare the latent factor averages. The final stage, which reflects factor invariance between groups, supports the hypothesis coded H3.

Discussion

This research has been put on the agenda to test the validity and reliability of the LAS (Sereti & Giossos, 2018), which was developed by targeting the higher education age group in high school and secondary school age groups. A total of 600 students studying at four secondary schools and three high schools were included in the EFA group,

and 270 students were included in the CFA group in this study, which was carried out on a sample of students attending high school and secondary school in Türkiye. The scale, which took its final form after the opinion of experienced researchers during the adaptation stage to Turkish, has a sufficient level of face validity. The factor construct and reliability of the scale were carried out using both groups of students. EFA results revealed that the scale had a two-factor construct and a total of 21 items, after three scale items with insufficient performance were eliminated. Item factor loads for the high school group ranged from .374 to .775, explaining 38.928% of the variance. Factor loads for the secondary school group ranged from .308 to .724 and this explains 36,681% of the total variance. The CFA results conducted for both groups proved that the two-factor construct was confirmed and the model fit indices met the guideline values frequently used in the literature.

Within the scope of reliability analysis, internal consistency reliability was examined, and Cronbach's alpha and McDonald's omega coefficients were used as a guide. The coefficients related to the LAS obtained in both high school and secondary school samples revealed that the scale reflected the internal consistency coefficient at the desired level. CR, which was applied additionally in the CFA stage, produced coefficients above .7, which is the cut-off value in the high school and secondary school groups. Two-factor analysis, which emerged in the scale forms applied in both high school and secondary school samples, revealed a low level of correlation as a result of correlation analysis. This indicates that each subscale can be used independently. In this study, unlike the original four-dimensional scale form, a two-dimensional scale form was obtained. The concepts of "Self-Management" and "Psychological Tendency," which are frequently emphasized in the literature, were preferred in labeling the sub-dimensions obtained in this study. In this case, it can be said that the LAS has sufficient psychometric properties in terms of validity and reliability.

The scale provided factorial equivalence by measuring "learner autonomy" in the same way in high school and secondary school samples. In this sense, the present study provides evidence of measurement invariance between two different groups, shedding light on future studies to determine autonomy in relevant groups. This is important because it shows that the "learner autonomy scale," which is mostly used in higher education samples, can be used to determine the level and probability of perceived autonomy in high school and secondary school populations. Beyond general information on measurement invariance, this study provided specific non-invariant item information (items 19, 20, and 21). In this regard, a partial invariance test was performed, and the factor averages were compared. However, more research is needed to determine why the intersections of items 19, 20, and 21 are not invariant. In addition, researchers and practitioners can enrich their understanding of differences between groups by further identifying sources of invariance by focusing on invariant items. This type of research will be especially valuable when cultural differences are apparently expected and when distinctive cultural factors are expected to influence item responses.

Although this study included many schools, the data are not representative of all students in Türkiye. Therefore, the results may not be generalizable to all students. Future research should repeat this study, including samples from different cultures, to achieve higher generalizability. It may be suggested to make comparisons of the level of autonomy measured by the "learner autonomy scale" between high school and secondary school students. This would provide additional evidence as to whether the "learner autonomy scale" is invariant between two different populations.

In this study, no attempt was made to measure test-retest reliability. If interventions are designed to promote 'learner autonomy' in groups of high school and secondary school students, changes in scores should be expected because the adapted scale aimed to identify current autonomous learning status. Testing the predictive power of the scale is considered important in terms of clarifying the relevant constructs and proposing new hypotheses.

Although the original scale focused on higher education students and distance learning, most of the insights emerging in the literature (Ahangar, 2023; Agustín-Llach & Alonso, 2017; Benson, 2007; Keuk & Lim, 2019; Mitchell, 2023) and the conceptual frameworks of the scale sub-dimensions also support the transferability of the scale by adapting it to other self-directed learning schemes, distance and face-to-face learning contexts, and to domain-specific. Therefore, this means that the concept of autonomy should be freed from the limitations created by the context of distance learning.

Candy (1991) and Guglielmino (1989) argue that the self-management skill required for autonomous behavior and performed in one context or situation should be generalizable to other contexts or environments. This assumption should be met with caution because it is not advisable to assume that someone with autonomy in a particular content area would have the same amount of preparation in an unconventional context (Fisher, King, & Tague,

2001). For a person to manage himself or herself in a certain content area, that person needs to have a certain level of knowledge in that area. Therefore, it may be advisable that the measurement of autonomy be done in a specific context.

In conclusion, this adapted assessment tool is a useful tool for researchers who want to develop autonomy in learning and for teachers who want to support autonomous learning with their students.
The scale will allow students to diagnose their attitudes towards autonomous learning and their self-management skills.

Conclusion

In this study, in which the LAS developed by Sereti and Giossos (2018) was adapted into Turkish, high school and secondary school samples were used, unlike the higher education context in which the original scale was configured. The psychometric properties of the "learner autonomy scale" produced acceptable results and revealed a two-dimensional construct unlike the original four-dimensional scale. The resulting factor analysis was validated in both groups, revealing invariant measures. In addition, the correlation analysis between the factors performed in these two groups shows that the sub-dimensions (self-management and psychological tendency) can be used independently. Thus, simply learning about self-management can give us an incomplete picture of individuals' psychological tendencies and lead to misleading inferences about the perception of "autonomy" as a whole. However, teachers can determine students' autonomous behaviors based on students' responses to the scale. This measurement tool, which will be useful in supporting autonomous learning, will allow teachers to diagnose their students' attitudes towards autonomous learning and their self-management skill levels.

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Author (s) Contribution Rate
ED contribution (Study design, preparation of the manuscript, review of the manuscript, data analysis, and interpretation of the data) rate is 60%. HK contribution (Study design and review of the manuscript) rate is 40%

Ethical Approval
Ethical permission (11.06.2022/9079) was obtained from Fırat University institution for this research.

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Appendix A: Turkish Version

Öğrenen Özerkliğini Belirleme Ölçeği	Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
1. Belirli hedefler oluştururum.					
2. Programımı çeşitli sorumluluklarıma göre özelleştiririm.					
3. Karşılaştığım sorunlara ilişkin alternatif çözümler bulurum.					
4. Çalışacağım konuları kendim seçerim.					
5. Öğrenme sürecimi değerlendirebilirim.					
6. Ne çalışacağıma kolayca karar veririm.					
7. Çalışmamdaki her adımı dikkatli bir şekilde planlarım.					
8. Çalışmamı belirtilen zamanda hazırlarım.					
9. Kolayca uyum sağlamam.					
10. Bilgisayarda eğitimim için gerekli programları kullanmam.					
11. Ders çalışırken kendimi yalnız hissederim.					
12. Ders çalışmak için kendimi kolayca harekete geçiremem.					
13. Derslere yalnız çalışırken kendimi çok mutlu hissetmem.					
14. Öğrenci arkadaşlarımla ders çalışamıyorum.					
15. Kişisel olarak derslerimin sorumluluğunu üstlenirim.					
16. Bilişsel/kavrama yeteneklerimi değerlendirebilirim.					
17. Sorunlarımı çözerim.					
18. Eksikliklerimi kabul ederim.					
19. Eğitimim için eğitim materyallerini (örneğin kelime kartları, çarpım tablosu vb.) bulabilirim.					
20. Baskı/zorlama hissetmem.					
21. Daha önce seçtiğim ödüllendirme yöntemine göre elde ettiğim her başarı için kendimi ödüllendiririm.					

Appendix B: English Version

Learner Autonomy Scale	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I create specific goals.					
2. I customize my schedule based on my various responsibilities.					
3. I find alternative solutions to the problems I encounter.					
4. I choose the subjects I will study.					
5. I can evaluate my learning process.					
6. I easily decide what to study.					
7. I carefully plan every step of my work.					
8. I prepare my work at the specified time.					
9. I do not adapt easily.					
10. I do not use computer programs necessary for my education.					
11. I feel lonely while studying.					
12. I cannot easily motivate myself to study.					
13. I do not feel very happy when studying alone.					
14. I cannot study with my fellow students.					
15. I personally take responsibility for my lessons.					
16. I can evaluate my cognitive and comprehension abilities.					
17. I solve my problems.					
18. I accept my shortcomings.					
19. I can find educational materials (e.g., word cards, multiplication tables, etc.) for my education.					
20. I do not feel pressure or coercion.					
21. I reward myself for every success I achieve according to the reward method I have previously chosen.					

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The Effect of Digital Game Design-Supported Coding Education on Gifted Students' Scratch Achievement and Self-Efficacy [1]

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Abstract
Coding tools that use blocks to create programs are popular among kids and play a key role in learning how to code. The effectiveness of the coding courses that are available nowadays depends on how well the tools match the students' needs. The aim of this study is to reveal the impact of digital game design-supported coding education with Scratch on gifted students' Scratch academic achievement and self-efficacy. The research was conducted with a one-group pre-test and post-test experimental design. The sample of the study consists of 40 gifted 3rd grade students studying at a Science and Art Center in Türkiye. The Scratch achievement test and the Scratch self-efficacy scale were used as pre- and post-tests before and after the training. The data from the study were analyzed with a dependent group t-test. The post-test scores of the students obtained from the Scratch achievement and self-efficacy scale showed statistically significant increases compared to the pre-test scores. It was revealed that digital game design-supported education contributed positively to students' scratch achievement and self-efficacy in coding.

Keywords: Coding, Digital game design, Gifted students, Self-efficacy, Scratch

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Introduction

Since the beginning of the 21st century, all developed and developing countries in the world have been implementing many practices to improve their education systems in order to benefit more from technology (Sabah, 2020). One of these practices is related to the popularization of coding education. Although coding is not a new concept, it has started to find a place at the pre-school and primary school levels, which are considered the basic steps of education, very quickly in recent years compared to previous periods (Sayın & Seferoğlu, 2016). Although the words coding and programming differ in the curricula of countries in literature reviews, they can be used in the same sense and are defined as performing a specified operation using computer commands (Keçeci et al., 2016).

As technology becomes more integrated in schools, it has become important to be familiar with educational software developed by computer technologies (Beauchamp, 2004). As we are going through a period in which technology is combined with computers and computers are combined with software that is a necessity of the age, coding software directs people to computerized thinking (Balanskat & Engelhardt, 2015). Hence, learning to code has become a must-have skill for the 21st century. The applications and software needed for this have started to be provided, and coding education is carried out with various coding tools in different age ranges (Olsson & Granberg, 2022). Thus, coding education can be started even at an early age, such as preschool.

Although coding education can be started at a young age, some problems may arise during the education process. The reason for this is often said to be the complexity and difficulty of the programming process and education in young age groups (Kert & Uğraş, 2009). In the literature review, coding studies have emerged in the last few years. The literature mainly focuses on how coding education affects lesson motivation, the views on coding education, and the analysis of documents. For example, Gültepe (2018) interviewed eight teachers who participated in a coding project and found that coding helped children to create ideas and gain self-confidence. Sırakaya (2018) received opinions from 21 middle school students on coding education. As a result of the interviews, students found block-based coding tools fun and interesting. Özbey (2018), in his research on coding education for preschoolers, discovered that coding can enhance children's cognitive abilities, boost their problem-solving skills, and help them apply it to other domains. These studies show that coding can be beneficial for children from an early age in many ways. For this reason, it becomes important for children to have high achievement and self-efficacy in the coding trainings they participate in.

Coding is a new topic of study, so it is misunderstood, incomplete, or unknown by parents, teachers, and students in the education field (Türker & Pala, 2018; Göncü, 2019). In the ongoing projects, there is a lack of equipment, knowledge, and educators due to this situation (Gültepe, 2018). While providing coding training, attention should be paid to whether the programs are suitable for the age group of children and the characteristics of the period in which they are (Resnick et al., 2009). This study used Scratch, a block-based coding program that is appropriate for elementary school students and has a simple interface for kids. One of the reasons for choosing Scratch is that it is understandable for students and can provide fun work opportunities (Ford, 2017). Hence, it is valuable to use programs like Scratch in coding education.

Scratch

Scratch is a program developed by researchers at the Massachusetts Institute of Technology Media Laboratory to teach coding (Balouktsis & Kekkeris, 2016). It is mostly designed for individuals between the ages of 8 and 16 and is now being actively used in approximately 160 countries. Users have the opportunity to share their projects on Scratch with other individuals. By coding with Scratch, children learn important strategies for problem solving, project design, and reasoning (https://Scratch.mit.edu/about). By sharing their Scratch projects interactively, students improve their problem-solving and creativity skills in an enjoyable way (Balouktsis & Kekkeris, 2016). The Scratch program, which is a block-based coding tool, has code blocks that can be moved with drag-and-drop logic, making coding easier for children. Besides being appropriate for elementary school students (Ford, 2017), the Scratch program can also be used by teachers and other adults without difficulty. Students can turn their work into a project and save it in a file so that they can work on it again later. The program can be used online on the internet as well as offline by installing it on computers. Each of the code blocks in the program means a command (Küçükkurt et al., 2016). By dragging and dropping the code blocks one after the other, the desired algorithm is created, and the designed project is made operational.

In order to develop coding skills in Türkiye, the Ministry of National Education shares educational content on http://scratch.eba.gov.tr and encourages the use of the Scratch program. In the literature (Brown et al., 2013), it is stated that lessons using coding and game design programs such as Scratch as a tool contribute to students' effective

learning of coding. At this point, it may be effective to utilize game design in coding education with Scratch to improve students' coding skills (Shute et al., 2011). Therefore, coding education within the scope of this study was supported by digital game design.

Digital Game Design

Digital games are computer programs that became more popular with the rise of desktop computers in the 1990s and are now part of life (Oblinger, 2004). Digital games are fun, challenging, goal- and performance-oriented, competitive, and require skills such as strategy development and decision-making. Therefore, they are attractive to students (Kiili, 2005; Koster, 2005).

Games have the potential to be used in the educational process with all previously stated features (Prensky, 2001). Educators can use students' passion for games to teach programming. In this context, digital games can be considered teaching material (Gee, 2005). Kafai (2006) states that one of the aims of using digital games in education is to enable learners to create digital games in the learning-teaching process. Because students learn the content while designing, they build their own games to achieve educational goals, and learning takes place during the construction of these games (Kafai, 2006). Game design is a process where the learner is active and in charge of his or her own learning process, which engages learners' interest rather than a passive experience (Smeets, 2005). According to Resnick (2007), meaningful learning can only take place when there is full participation and full creation. For this reason, he proposed the process of creative game design. According to Brennan (2011), game design develops computational thinking skills such as mathematics, programming, and algorithmic thinking, as well as skills such as creativity and problem solving.

Educators emphasize that game design activities should be carried out in programming courses in order to adapt to the process, especially for beginners (Gee, 2005; Moreno, 2012; Rajaravivarma, 2005). In this way, it is aimed at increasing the motivation of beginners by designing games and fostering a positive attitude towards programming. With game design, coding lessons, which are generally seen as difficult and boring, can become more enjoyable and fun. By designing games with tools such as Scratch, students can improve their coding skills in a fun way by interacting with their friends (Resnick et al., 2009).

The necessity of actively using coding and game design tools such as Scratch in the education of gifted individuals has recently become more prominent (Kim et al., 2013). This is because gifted individuals' visual intelligence, motivation, and creativity should be supported along with their intellectual abilities (Callahan, 2000). In Türkiye, gifted students' education is provided in Science and Art Centers (SAC). Students who are identified as gifted attend SACs in the evening or at weekends to receive education in addition to their regular schools. Students receive at least four hours of education per week in these institutions. They have the opportunity to receive education in the fields of science, social sciences, mathematics, visual arts, music, and coding.

One of the fields that gifted students are most interested in is coding (Shin et al., 2013). Using the Scratch program and digital game design in coding education for these students can produce important results. In the literature, there is not enough research about coding education via Scratch and digital game design with gifted students. For this reason, it is important to reveal the effect of coding education via Scratch and digital game design on gifted students' coding achievement and coding self-efficacy beliefs.

Purpose of the Study

In this study, it was aimed at revealing the effect of digital game design-supported coding training with Scratch on the achievement and self-efficacy of gifted 3rd grade students. In line with this goal, students received coding and digital game design education using the Scratch program. They improved their coding skills by designing various games. Accordingly, the problems of the research are as follows:

1. What is the effect of digital game design-supported coding training on gifted students' Scratch achievements?
2. What is the effect of digital game design-supported coding training on gifted students' Scratch self-efficacy levels?

Methodology

The study was conducted in line with the one-group pre-test post-test design, which is a weak experimental design. In this design, the effect of the experimental procedure is tested with a single-group study. The measurements of the subjects regarding the dependent variable are obtained as a pre-test before the application and a post-test after the application using the same subjects and the same measurement tools (Büyüköztürk, 2016). The application was completed in a three-week period. The effects of the training on gifted students' Scratch success and self-efficacy were analyzed.

Population and Sample

The sample of the study consists of 40 gifted primary school students studying in the 3rd grade at one SAC in Antalya province in Türkiye. The participants were determined as a sample for convenience. There are five SACs in the same city, and hence the accessible population is 148 students studying at the same grade level in five SACs. The target population is all 3rd grade gifted learners in the country. The number of students in the sample is approximately 27% of the accessible population. When the gender frequencies of the students in the sample were analyzed, 15 (37.5%) students were female and 25 (62.5%) were male.

Data Collection Tools

Two data collection tools were used in the study. These are the Scratch Achievement Test and the Scratch Self-Efficacy Scale. Information about the data collection tools is given below.

Scratch Achievement Test

With the application in the research, it was aimed that the students would be able to code and design digital games with Scratch. Towards this goal, the Scratch Achievement Test (SAT) was used to determine to what extent the given training affected students' coding success. The SAT was developed by Büyükkarcı (2019) and consists of 20 multiple-choice items. The KR-20 reliability coefficient of the test was reported as .89 by the researcher. It was calculated as .71 in the post-test application of the current study. The SAT was used as a pre-test and post-test in the study.

Scratch Self-Efficacy Scale

The other scale used in the study was the Scratch Self-Efficacy Scale (SSES). Through this scale, the impact of the training on students' Scratch self-efficacy was determined. The SSES was taken from Büyükkarcı's (2019) research and has a five-point Likert structure. There are 12 items on the scale. The Cronbach Alpha reliability coefficient of the scale was reported as .95. It was found to be .89 according to the post-test application of the current study. The scale was used before and after the implementation, and data were collected.

Course Materials

A computer was provided for each student during the coding process. A smart board was used so that the students could see what the teacher explained through his or her computer. 14 pages of coding papers were prepared for students to use as a resource for coding through Scratch. The papers prepared by the researchers were given to the students before the Scratch training. The coding papers primarily included the Scratch interface. The features and usage of the stage, adding decor, adding puppets, costumes, and sound sections were explained with pictures. Then, the tasks of the block package in nine categories in the Scratch program were included. The block groups are movement, appearance, sound, events, control, perception, operators, variables, and my blocks, respectively. The purpose for which the code blocks under each block group will be used is expressed in pictures.

Training Process

Before starting the coding and digital game design training, the SAT and SSES were administered to the students as pre-tests. After the application of the tests, the training started. The training was completed in a total of 18 hours over three weeks, consisting of six hours per week. The researcher and an expert information technology teacher took part in the implementation. In the classroom where the training was held, computers used by the students were also available, along with equipment such as smart boards, desktop computers, printers, internet connections,

etc. At the beginning of the training, 14-page coding papers were given to the students. It was ensured that the students could follow the training. The researcher was also present in all lessons and took the necessary precautions to prevent technical problems, student requests, etc.

During the training process, the interface of the Scratch program was explained, and students were provided with the menus and code blocks they would use while coding. The features and usage of the stage, adding decor, adding puppets, costumes, and sound sections were explained with pictures on the coding sheets. Movement blocks, view blocks, sound blocks, event blocks, control blocks, detection blocks, operator blocks, and variable blocks in the block menu were introduced to the students. Students were shown the variables and codes that they can use while designing games. Students made sample coding applications and game designs on Scratch based on what they learned during the education process. They were also able to follow the properties of all menus and code blocks shown by the teacher during the application process on the coding sheets. After the training, the SAT and SSES were administered to the students as post-tests, and the process was completed by collecting the data.

Data Analysis

Descriptive and inferential statistics were applied to test the problems of the research. Descriptively, the mean, standard deviation, skewness, and kurtosis values of the pre-test and post-test scores of the SAT and SSES applications were calculated. The values found for the pre-test and post-tests were compared. A dependent group *t*-test was used as inferential statistics to find out whether the difference between the pre-test and post-test scores of the students regarding SAT and SSES was significant or not.

Results

Descriptive Statistics Results

The descriptive analysis results of the SAT and SSES are shown in Table 1. According to Table 1, the mean pre-test score of the students on the SAT is 9.70, and the mean post-test score is 17.10. When the scores obtained from the SSES are analyzed, the mean pre-test score of the students is 27.95, and the mean post-test score is 52.50. It is seen that students' average means of the SAT and SSES scores increased by 7.4 and 24.55 points, respectively, from pre- to post-tests.

Table 1. Descriptive Statistics Results of the SAT and SSES

		N	Mean	Sd. Dev.	Skewness	Skewness Stand. Error	Kurtosis	Kurtosis Stand. Error
SAT	Pre-test	40	9,70	3,86	-,24	,37	-1,11	,73
	Post-test	40	17,10	2,60	-1,43	,37	1,48	,73
SSES	Pre-test	40	27,95	9,26	,37	,37	-,10	,73
	Post-test	40	52,50	6,72	-,85	,37	-,05	,73

According to the post-test data obtained from the Scratch achievement and self-efficacy tests, the skewness and kurtosis values are between -1.5 and +1.5. According to these values, the data are almost normally distributed (Tabachnick & Fidell, 2013).

Inferential Statistics Results

A dependent group *t*-test was used to reveal the effect of digital game design-supported Scratch education on students' code success. The data were analyzed to check the statistical significance of the difference between the pre-test and post-test scores of the students regarding the measurement tools. Assumptions regarding the analysis were tested, and no problems were encountered. The values for the dependent group *t*-test are shown in Table 2.

Table 2. Dependent Groups t-test Results for the SAT

	Mean	S. Dev.	t	sd	p	d
Pre-test Post-test	-7.40	3.48	-13.43	39	.000	2.12

According to Table 2, a statistically significant difference was found in favor of the post-test scores as a result of the dependent group *t*-test conducted on the pre-test and post-test data of the SAT (*p*=.000). The post-test scores obtained by the SAT were significantly higher than the pre-test scores. Considering the calculated effect size (*d*=2,12), the value is at a high level (Green & Salkind, 2005). These results reveal that the training had a significant effect on students' coding success.

Likewise, a dependent group *t*-test was applied to reveal the effect of digital game design-supported coding education on students' self-efficacy. Assumptions regarding the analysis were checked, and no problems were encountered. The values for the dependent group *t*-test are given in Table 3.

Table 3. Dependent Groups t-test Results for the SSES

	Mean	S. Dev.	t	sd	d	d
Pre-test	-24.55	8.71	-17.81	39	.000	2.81
Post-test						

According to Table 3, a statistically significant difference was found in favor of the post-test scores as a result of the dependent group *t*-test conducted on the pre-test and post-test data of the students' SSES (*p*=.000). The post-test scores obtained by the students from the SSES are significantly higher than the pre-test scores. The calculated effect size (*d*=2.81) shows that this difference is at a high level (Green & Salkind, 2005). These results reveal that the training had a significant effect on students' self-efficacy levels.

The results obtained by the students from the SAT and the SSES reveal that the coding training was successful and that the training was completed as targeted. Thus, it can be said that the students received an effective education in terms of coding and digital game design with the Scratch program.

Conclusion and Discussion

The results of the study revealed that the coding achievement of gifted 3rd grade students increased descriptively from pre- to post-tests. It was also supported that the increase in the average means was statistically significant based on the result of the dependent group *t*-test. Accordingly, it can be stated that digital game design-supported coding training was effective in increasing the scratch achievement of the participants. This result overlaps with those of the previous research (Büyükkarcı & Taşlıdere, 2021; Çağıltay, 2007; Rizvi et al., 2011; Westcott, 2008). In their study, Büyükkarcı and Taşlıdere (2021) report that scratch education increased 4th grade primary school students' coding achievement. Likewise, Rizvi et al. (2011) announced that game design activities with Scratch in the programming course were effective on the coding achievement of first-year university students. In addition, Westcott (2008) stated that game design training with Scratch had an effect on programming achievement. The research conducted by Çağıltay (2007) reports that students who played games with Scratch had higher coding achievement than the students who did not. In addition, the results of the current study are also similar to the previous ones (Bishorp-Clark et al., 2007; Cooper et al., 2003; Howland & Good, 2015), who report that digital game design trainings using visualization tools such as Alice and Flip increase coding achievement.

Another result obtained in the current study is that students' Scratch self-efficacy scores increased significantly. This finding supports various research results in the literature (Armoni et al., 2015; Nikou & Economides, 2014; Rizvi et al., 2011; Serim, 2019). In the study of Armoni et al. (2015), the use of Scratch in coding increased students' self-efficacy levels. Nikou & Economides (2014) reported that Scratch was effective in learning programming in K–12 educational environments and that students' self-efficacy increased. Rizvi et al. (2011) found that students who used Scratch in programming courses had high self-efficacy. In Serim's (2019) study, coding education with a gamification approach positively affected students' self-efficacy perceptions towards coding. These studies show that the use of Scratch contributes to students' self-efficacy.

Scratch is a block-based coding tool with colorful content that students can easily use (Sırakaya, 2018). In the implementation process, the realization of digital game design-supported education in a fun way increased students' motivation. Students' high motivation may have positively affected their self-efficacy (Bandura, 1977). According to the study conducted by Saez-Lopez et al. (2016), the fact that 5th grade students had high motivation ensured their desire and commitment to the lesson. However, according to the results obtained in Korkmaz's (2016) research, the fact that students have positive results about Scratch is due to the features of Scratch. Korkmaz (2016) conducted his study with university students, in which he stated that the negativities experienced in coding education are a decrease in motivation, attention, and perception. The current study was conducted with gifted

students in the 3rd grade of primary school. The difference between these results may be due to the fact that the students in the studies were in different educational and age groups. In addition, the gifted students in the current study participated in coding and digital game design training for the first time without any previous experience in coding, which may have led to positive results.

Recommendations

In this study, coding and digital game design training with Scratch were given to gifted 3rd grade students in primary school. As a result of this training, it was determined that students' academic achievement and self-efficacy in coding increased. Therefore, it may be recommended to conduct scratch-based training with student groups at different levels. Since coding and digital game design activities with Scratch can attract students' interest, they can be integrated into teaching models and used in teaching content in different fields. Qualitative research can be conducted on the reasons for the increase in students' success in coding education. In future studies, students' views on the use of digital game design in coding education can be examined. In addition, students' perspectives on the effectiveness of the Scratch program can be examined. It was concluded that the method used in the study improved students' self-efficacy. The effect of this method on different variables such as attitude, motivation, and creativity can be investigated. In order to be able to use coding education supported by digital game design at all times, classes supported by information technologies can be created in SACs and all kinds of state-owned schools. Similar future studies would be conducted with gifted or non-gifted students, and their results should be compared with those of the current research.

Limitations

This research was conducted in a science and art center in the province of Türkiye. The study was conducted with 40 gifted students, and two measurement tools, the SAT and SSES, were administered. Therefore, all the results in the study are based on the data collected from these students and the tests.

Author (s) Contribution Rate

Both researchers contributed at every stage of the research.

Ethical Approval

Ethical Approval (15/10/2020-79673485-302.08.01-E.45707) was obtained from Burdur Mehmet Akif Ersoy University for this research.

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Argumentation and Discourse Analysis in Future Intelligent Systems of Essay Grading

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Abstract
Intelligent systems of essay grading constitute important tools for educational technologies. They can significantly replace the manual scoring efforts and provide instructional feedback as well. These systems typically include two main parts: a feature extractor and an automatic grading model. The latter is generally based on computational and artificially intelligent methods. In this work, we focus on the feature extraction part. More precisely, we focus on argumentation and discourse-related features, which constitute high-level features. We discuss some state-of-the-art systems and analyze how argumentation and discourse analysis are used for extracting features and providing feedback.

Keywords: Automatic essay scoring, Artificial intelligence, Natural language processing, e-Learning, assessment

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Introduction

Automatic essay scoring (AES), also called Automated Essay Grading (AEG) or Automated Essay Evaluation (AEE), concerns grading essays using computers with minimum, or even without, human intervention. These systems constitute a valuable asset for future educational technologies. AES are becoming more and more widespread in modern educational technologies, especially for large open classes like MOOCs (Massive Open Online Courses). The main advantage of AES is preserving teachers' effort and time. Indeed, manual scoring of essays is a hard and laborious process, especially for massive classes and language courses. AES also overcomes some factors that influence manual evaluation, such as the evaluator's mental state, the biases, and the disparity between evaluators (Alqahtani and Alsaif, 2020). Furthermore, most of the current AES provide not only a holistic score but also instructional feedback to the user, which considerably helps to improve the writing quality. This is as if each student has her or his own personal tutor, whom she or he can permanently consult.

AES for English has been widely introduced, and many commercial applications are available. Project Essay Grade (PEG) (Page, 1966) was the first AES system for English. Other early works include IntelliMetric, developed by Vantage Learning in 1998 (Foltz et al. 1999); E-Rater, developed by Educational Testing Services (ETS) in 1998 (Burstein, 2003a); and Intelligent Essay Assessor (IEA) (Landauer, 2003). Recent works are based on more sophisticated AI methods, which are directly applied to texts without using hand-crafted features (Dasgupta et al. 2018; Nadeem et al. 2019; Cropley and Marrone 2022). This aims at avoiding feature extraction steps, which are time-consuming (Uto et al., 2021).

AES systems have been based on a large variety of methods, ranging from simple similarity measures to sophisticated AI methods like deep neural networks. In terms of features, AES systems have also used a large variety of features, ranging from word and sentence counts to discourse, argumentation, and coherence analysis (Ke and Ng, 2019; Hussein et al., 2019; Wang et al., 2022). In this paper, we focus on high-level features used in AES. More precisely, we study the role of argumentation and discourse analysis in modern AES systems and discuss how they can be integrated into future systems.
The rest of this paper is organized as follows: Section 2 gives some theoretical background about AES. It presents the architecture of these systems and the features used. This section also presents RST because it is extremely related to argumentation and discourse analysis in AES. Section 3 describes some state-of-the-art AES systems and discusses how they integrate argumentation and discourse concepts. Finally, discussion and conclusion are given in Section 6.

Theoretical background

Architecture of AES systems:

These systems typically include two main parts: a feature extractor and a prediction model. To score an essay, it is first presented to the feature extractor, then the obtained features are presented to the prediction model, which provides a score for the essay (Figure 1).

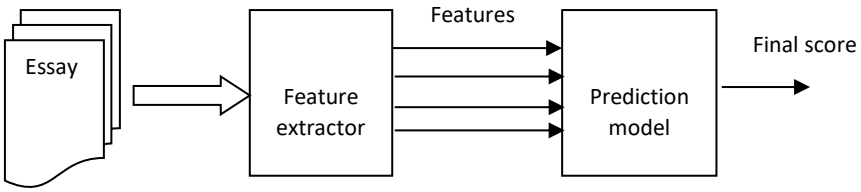

Figure 1. A typical representation of an AES system

Prediction models

AES can be classified into two categories: handcrafted feature-based and neural-based methods. In the first category, the two steps, i.e., feature extraction and prediction, are performed independently, while in the second, a neural network performs both tasks. Since the main focus of this work is analyzing features, we give only a simplified description of some concepts of predicting methods:
Latent Semantic Analysis (LSA) is a statistical method that represents meaning in a text. The application of LSA to a corpus of texts consists of representing the texts with a term-by-document matrix, in which the columns

represent documents and the rows represent terms. A term can be a word, phrase, or other unit. A document can be a sentence, a paragraph, or something else.
Artificial neural networks (ANN), or simply neural networks (NN), are computing systems inspired by the biological neural networks in animal brains. An ANN consists of an ensemble of connected units called artificial neurons. Neural networks are machine learning-based models that learn via training examples labeled with the desired output. In AES, an ANN can be trained using a corpus of scored essays. After training, it can predict scores for new essays.
Bidirectional Encoder Representations from Transformers (BERT) (Devlin et al., 2018) is a new powerful language model introduced by researchers at Google. It consists of transformer encoder layers, and it converts each word into an integer code.

Features

AES systems are based on a large variety of features, ranging from simple word and sentence counts to high-level features like discourse, argumentation, and coherence analysis (Ke and Ng, 2019; Hussein, 2019; Wang, 2022). (Table 1) illustrates an example of categorization of the AES features (Ramesh and Sanampudi, 2022).

Table 1. Types of features used in AES (Ramesh and Sanampudi, 2022)

Statistical features	Style-based features	Content-based features
Essay length with respect to the number of words, Essay length with respect to sentence Average sentence length, Average word length, N-gram	Sentence structure, Part of speech (POS), Punctuation, Grammatical, Vocabulary, Logical operators	Cohesion between sentences in a document, Overlapping (prompt), Relevance of information, The semantic role of words, Correctness, Consistency, Sentence expressing key concepts

In Table 1, N-Gram is a series of N adjacent letters, syllables, or words. They can be extracted from a text or speech corpus.

Argumentation and discourse features can be classified in the third group, i.e., content-based features.

Rhetorical Structure Theory (RST):

Rhetorical Structure Theory (RST) (Mann and Thompson, 1988) is one of the most important methods for discourse analysis. The central principle of RST is rhetorical relations, which connect two adjacent and non-overlapping text spans, called discourse units. These units are: nuclei (N), the most important parts, and satellites (S), the less important. The role of satellites is just to help understand the nuclei. The text is still understood without satellites.
Discourse relations in RST are "nucleus-satellite" relations or "multinuclear" relations, where both spans are important. Schemas specify how spans of text can appear, and they define the possible RST text structures. In RST, there are five kinds of schemas, represented by the five examples illustrated in Figure 2. The curves represent relations, and the straight lines represent nuclear spans. According to Mann and Thompson (1988), the CONTRAST schema always has exactly two nuclei, while both sequence and junction have indefinitely many nuclei, which they are without satellites. Rhetorical relations reflect semantic, intentional, and textual relations that hold between text spans.

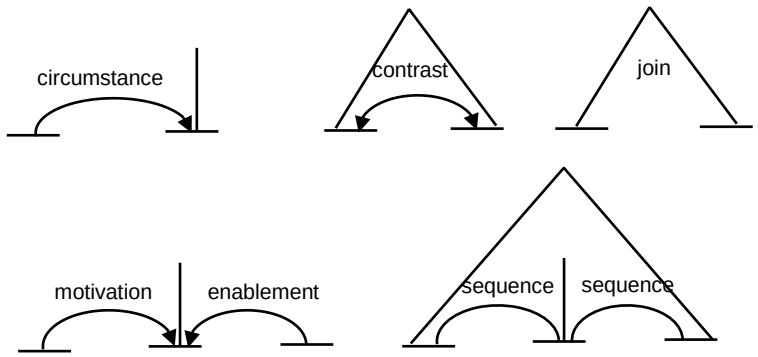

Figure 2. Examples of the five schemas types in RST. The horizontal lines represent text spans and the vertical and diagonal lines represent nuclear spans (Mann and Thompson, 1988)

(Figure 3) illustrates the relations defined in Mann and Thompson (1988). They are grouped according to a specific kind of resemblance. Each group includes relations that share some characteristics but differ in one or two particular attributes.

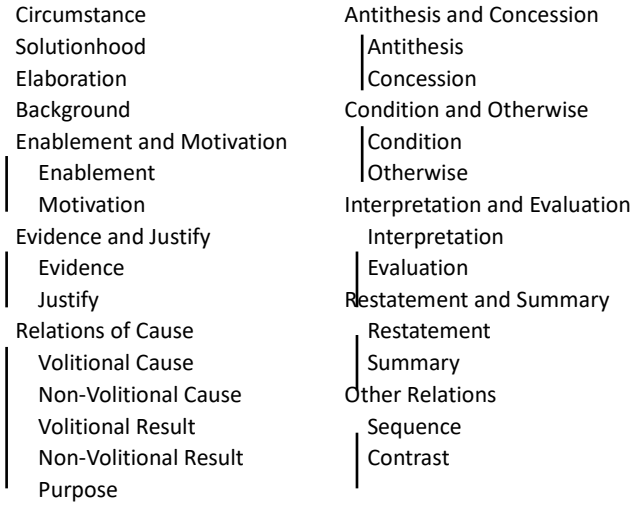

Figure 3. The rhetorical relations defined in (Mann and Thompson, 1988)

In RST, a discourse structure can be represented by a hierarchical tree in which nodes are linked with rhetorical relations. Nodes are either nuclei or satellites. (Figure 4) illustrates an example of a text's RST tree taken from Mann and Thompson (1988). The nuclei are represented by straight lines, and the satellites by arcs.

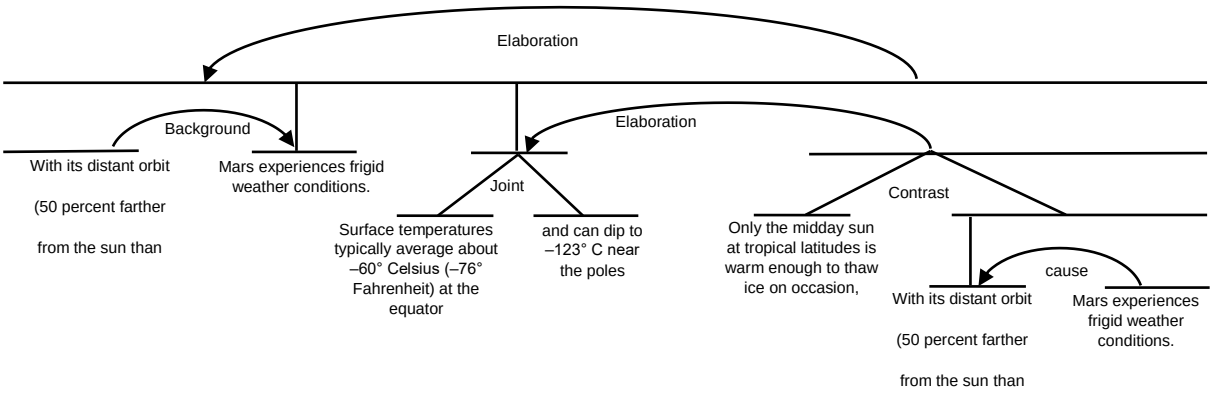

Figure 4. Example of rhetorical structure tree (Mann and Thompson, 1988)

Argumentation and discourse analysis in AES systems:

Discourse structures and modes in AES:

Discourse structure is an important factor for evaluating essay cohesion. Accordingly, defining discourse structures have been introduced in several AES systems. Most approaches to defining discourse are based on RST. The following paragraphs describe some works that propose AES systems based on discourse analysis and RST:

In Burgstein (2003b), the authors proposed a system that automatically identifies discourse structure in essays. They assumed that essays can be divided into sequences of discourse parts and that each part is related to a global communicative goal. They encoded the communicative goals using labels that are commonly used in teaching writing, like thesis statements, main ideas, and conclusions. The proposed system is based on constructing a rhetorical structure tree using an automatic discourse parser. It gives RST-based rhetorical relations to the essay sentences. Then, two features are associated with each sentence. The first feature represents if the parent node is a

nucleus or satellite, while the second feature represents its rhetorical relation. In addition to rhetorical features, the authors used other features, such as syntactic structure and lexical elements. For example, they consider some lexical items like “opinion” and “feel” as terms linked to thesis statements and the term “in conclusion” linked to conclusions. These terms help the system define discourse structure. To train and evaluate the proposed system, the authors introduced a dataset that contains annotated essays. The adopted discourse elements are: title, introductory material, main idea, supporting idea, conclusion, and irrelevant segments. The latter indicates that it is not fitting for the other discourse categories.

Song et al. (2017) proposed a system that automatically identifies discourse mode in essays. These modes are: narration, exposition, description, argument, and emotion expression. They introduced a corpus of narrative Chinese student essays that were manually annotated with discourse modes at the sentence level. In addition, they introduced two discourse-mode-based features for automatic essay scoring. These two features are: (i) the proportion of each discourse mode, which is calculated as the ratio of the number of corresponding sentences to the total number of sentences; (ii) the bag of N-grams of discourse modes, which is based on the mode’s sequences of sentences in the essay.

In Azmi et al. (2019), the authors checked the cohesion of an essay by applying RST. In deed, the structures in RST are hierarchic, and they can be represented using an RST-tree (rhetorical structure tree). The authors examine the coherence relations in a given essay by constructing an RST tree. Accordingly, if the entire essay can be transformed into an RST tree, then it can be considered coherent. In addition, they determine the quality of the cohesion by the number of levels in the generated RST tree. (Feng et al., 2014) studied the effect of deep discourse structures on evaluating texts. They compared a model with a full hierarchical discourse structure based on RST against two models based on shallow discourse relations. They concluded that deep discourse structures provide a better evaluation of text coherence.

Discourse structure has also been evaluated in spontaneous speech. For example, Wang et al. (2017) used an RST-annotated corpus for evaluating discourse structure in non-native speech. This corpus consists of 600 speeches. They examined eight extracted features, which are: the number of EDUs (Elementary Discourse Unit); the number of relations; the number of awkward relations; the number of rhetorical relations; the number of different types of rhetorical relations; the percentage of rhetorical relations out of all relations; the depth of the RST trees; and the ratio between the number of EDUs and the tree depth. They concluded that the RST annotation provides similar inter-annotator agreement rates. They had high correlations with holistic speaking proficiency and discourse coherence scores. In addition, they concluded that the percentage of rhetorical relations is the most influential feature. The same authors (Wang et al., 2019) introduced a larger corpus, which contains 1440 non-native speeches annotated using RST. They proposed an automatic parser trained on this corpus. Then, some features extracted from the parsed RST trees are used for predicting holistic proficiency scores.

Argumentation in AES

Argumentative discourse structures constitute a hard task because of two properties “(Stab and Gurevych, 2014): First, argumentative relations are generally implicit. Second, in contrast to RST, argumentative relations also hold between non-adjacent sentences or clauses. Recently, argument evaluation has attracted a lot of attention in the AES community. For example, Stab and Gurevych (2014) proposed an approach for finding argumentative discourse structures even with missing discourse markers. For this purpose, they introduced four feature sets: (i) Structural features, such as the location and punctuation of the argument component and its covering sentence; (ii) Lexical features, such as verbs, adverbs, and modals; (iii) Syntactic features extracted from parse trees, which are the number of sub-clauses included in the covering sentence and the depth of the parse tree; (iv) Contextual features extracted from the sentence preceding and following the covering sentence, such as the number of punctuations, the number of tokens, the number of sub-clauses, and the presence or not of modal verbs. Persing and Ng (2015) proposed to consider argument strength as a distinct dimension for scoring essays, and they introduced a corpus and a predicting model for this task. The introduced corpus contains 1000 essays annotated with argument strength; each sentence of the essays is labeled with an argument label. They considered the five following labels: Opposes, Supports, Claim, Hypothesis, or None. They used seven sentence-labeling rules. For example, the first rule is: “Sentences that begin with a comparison discourse connective or contain any string prefixes from *conflic*t or *oppose* are tagged Opposes." Subsequently, they converted the scoring into features to train the prediction model. The resulting three features define: (i) if the essay comprises at least one sentence tagged Hypothesis; (ii) if the essay comprises at least one sentence tagged Opposes; (iii) the sum of sentences tagged Claim or Support divided by the total number of paragraphs. According to the authors, these features are meaningful because, for example, an essay with lots of supporting sentences provides stronger arguments. The authors added other features like

prompt agreement, which specifies the prompt statement as: agree strongly, agree somewhat, neutral, disagree somewhat, disagree strongly, not address, or no opinion.

Evaluating argumentation has also been used in the business domain. For example, Williams et al. (2021) proposed a conversational tool called "ArgueTutor," which aims at helping students write more convincing texts with adaptive argumentation feedback. They used a corpus comprising 1000 business model essays. The texts are annotated for their argumentative components, which are: claim, premise, and relations. The authors trained a BERT-based model to identify and classify argument components used for evaluating writing skills, thus providing adaptive recommendations to assist students in improving their argumentation. (Wambsganss and Niklaus, 2022) proposed a scheme for annotating argumentation, and they introduced an annotated corpus of persuasive student-written business model pitches. This corpus consists of 200 German models with 3,207 sentences annotated for argument components, their relations, and six persuasiveness scores on different levels. Then, they trained a model on this corpus and integrated it into an argumentation writing tool to support students with specific argumentation feedback and recommendations.

Discussion and conclusion

AES systems aim not only to score essays but also to provide valuable feedback and recommendations. The given feedback includes several rubrics like spelling, grammar, or style. This constitutes an important tool in large-scale classes like MOOCs. Recently, the researchers have introduced more sophisticated feedback, like argumentation. This allows the users to enhance their argumentation skills. AES systems will certainly perform three important tasks: assessment, adaptive training, and personal tutoring. Indeed, tutoring tools have begun to emerge, like “ArgueTutor (Wambsganss et al., 2021), which help students enhance their argumentative capacities in the business domain. In the future, several other domains will certainly benefit from these tools. For example, law students can benefit from specialized tutoring tools that help them write pleadings and evaluate their convincing abilities.
In terms of data, the availability of datasets for a specific problem allows this problem to be widely processed, especially with learning machine-based methods. The public databases permit comparing and discussing the performance of different methods. For example, the RST Discourse Treebank (Carlson et al., 2001) has facilitated RST-based discourse analysis, and consequently, a lot of parsers are now available (Wang et al., 2019). Currently, as mentioned in Section 3, many corpuses have been introduced, including: discourse elements, discourse modes, discourse structure, argumentation discourse structure, argumentation strength, and argumentative components. Most of these corpora constitute initial work for specific tasks. In the future, these corpora will certainly be increased and enhanced. Another issue concerning corpora is the language. Indeed, the argumentation structure isn’t generally the same in different languages. In addition, students with different original languages who are studying a specific language use different argumentation structures. Some corporations dealing with this issue have already been introduced. For example, Putra et al. (2021) introduced a corpus containing essays written by English learners from many Asian countries.

The devolvement in natural language processing, big data, artificial intelligence, and the other research domains involved in developing AES systems is certainly not sufficient to gain teachers’ confidence. Contrary to popular belief, involving teachers in the process of elaborating AES systems reinforces their confidence and increases the dialogue between developers and teachers. Indeed, teachers and experts have already been involved in designing some AES systems by asking them about the main features for grading essays. The development of future AES needs more involvement from teachers, especially in designing feedback and recommendations. On the other hand, machines can’t really understand the language or the art of writing. Therefore, integrating high-level features like discourse and argumentative analysis enhances, to some extent, their judgment of the essays’ beauty. This will never be achieved without the aid of teachers and education experts.

Ethical Approval

The author declares that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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The Integration of 21st Century Skills into Secondary School English Classes and the Challenges Faced by Teachers[1]

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Abstract
The aim of this study is to examine the utilization of 21st century skills by secondary school English language teachers and to investigate whether their background has a role in using these skills. The study also aims to shed light on the challenges teachers face when integrating these skills into their teaching practices. A mixed-methods research design, which incorporates the scale and an online survey with open-ended questions, was used to accomplish the aims of the study. The data were obtained online using 21st century teaching and learning scale developed by Hixson et al. (2012) and an online survey. A total of 119 teachers were reached using convenience and snowball sampling methods, with 26 of them participating in the online survey. The quantitative findings of the study showed that teachers used 21st century skills approximately once or three times a month, and the most used skill was using technology as a tool for learning, while local connections were the least. According to the t-test results, a significant difference was found in the use of these skills between private and public school teachers, with private school teachers employing these skills more frequently than their public school counterparts. Furthermore, it was revealed that teachers who received 21st century skills training integrated some of the 21st century skills into their lessons more often than those who did not. In addition, it was found that years of experience played a role in the implementation of these skills. According to the post-hoc test, less experienced teachers integrated 21st century skills more frequently than more experienced teachers. On the other hand, the teachers' educational background did not show any significant difference in using these skills. According to the findings obtained from the content analysis of the online survey, the lack of qualified in-service and pre-service training on 21st century skills, poor curricula, lack of required materials and infrastructure, and unsupportive attitudes of the administrators were the challenges encountered by teachers.

Keywords: 21st century skills, 21st century teaching skills, 21st century skills in English language teaching, the challenges of the teachers, secondary school English language teachers

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Introduction

In the preceding century, the foundational skills of reading, writing, and arithmetic, collectively known as the 3Rs, were considered essential for success in both the workplace and in society (Wang, 2012). Individuals were expected to apply these skills to enhance the economic prospertiy of the nation. Education at that time was shaped around the expectations of the world of work; in this respect, the curriculum was based on equipping students with digested facts and arithmetic calculations, and accordingly, teachers' role was to disseminate the knowledge (Dede, 2007, 2010; Prensky, 2014; Trilling & Fadel, 2009; Voogt & Roblin, 2010; Wang, 2012). However, as technology advanced, a shift in education became necessary, as computers began to take on, replace, or supplement a significant portion of tasks previously performed by individuals (Levy & Murnane, 2004). The transition from human labor to computers and other technological devices has reduced the number of workers in low-skill jobs such as assembly line work and rule-based tasks. Supporting this view, a report by Drucker (2001) revealed that between 1960 and 1999, the number of manufacturing workers fell by half. In contrast to this decline, physical output in the manufacturing sector doubled or tripled. Due to the major shift in the economy along with globalization and ICT, some higher skills called 21st century skills, have become necessary for people to function well in society, get employment, and participate productively in the world of work (Care et al., 2012; Greenhill, 2010; Trilling & Fadel, 2009; Voogt, 2008; Wang, 2012). As a result, having people with 21st century skills is now the hallmark of a functioning economy and society, and nations with individuals with these skills have paved the way for economic progress (Reich, 1992, as cited in Voogt, 2010). Although having 21st century skills is now required in all spheres of life, particularly the workplace, some studies (e.g., Casner-Lotto & Barrington, 2006, Microsoft, 2011) have revealed that employers are still unsatisfied with employees who do not have these skills. As a result of the aforementioned shifts in the 21st century, a change in education has been regarded as essential for a well-functioning society and economy (Care et al., 2012). It is well known that education and economic development are closely related and that education is essential to ensuring national prosperity and fostering economic growth (Stevens & Weale, 2003; Trilling & Fadel, 2009). Many frameworks have been developed to close the gap between real-world demands and education, including P21 (Partnership for 21st Century Skills), ATC21S (The Assessment and Teaching of 21st Century Skills Framework), and Cambridge Life Competencies and Framework. Because teachers are at the forefront of the change in 21st century education, they need to know what 21st century skills entail and integrate them into their teaching practices. Each of the frameworks defines 21st century skills in various ways. In this study, eight skills compiled by Hixson et al. (2012) were used to more effectively measure educators' teaching practices. The definitions of these skills are given below.

Critical thinking skills: These skills encompass learners' capacity to analyze intricate problems, investigate inquiries lacking straightforward solutions, assess diverse viewpoints or information sources, and arrive at well-founded conclusions rooted in data and logical reasoning.
Collaboration skills: They refer to learners being able to collaborate with one another to solve problems or find answers, to work efficiently and courteously in teams to achieve a common objective, to accept shared responsibility for finishing a task.
Communication skills: They refer to learners being able to organize their ideas, data, and findings and communicate these successfully through a number of mediums, in addition to orally and in writing.
Creativity and innovation skills: These skills refer to learners who are capable of developing and improving answers to complex issues or tasks based on synthesis, analysis, and finally merging or presenting what they have learnt in novel and creative ways.
Self-direction skills: They refer to learners being able to take ownership of their own learning by choosing their own topics and developing their own learning strategies, and being able to evaluate their own work and respond to their own work (Hixson et al., 2012, p.1)
Global connections: It refers to learners being able to comprehend global, geopolitical issues, including awareness of other culture's geography, culture, language, history, and literature.
Local connections: It refers to learners being able to apply their knowledge to situations and problems in their communities.
Using technology as a tool for learning: It refers to learners being able to use appropriate information and communication technology to manage their learning and produce things.

Unlike in the past, when a teacher-led approach was prevalent, the role of the teacher has fundamentally evolved in the 21st century. They are now expected to contribute to course content, facilitate learning, serve as coaches, promote 21st century skills, and inspire learners to explore diverse applications of their acquired competencies and knowledge (Scott, 2015; Wang, 2012). This shift in educators' roles is deemed necessary in English language teaching because English has become widely used in many aspects of life over recent decades, including global forums, media, science, ICT, finance, diplomacy, sports, and entertainment (Pardede, 2012). English is therefore not simply a language used in the USA and UK but also the language of communication on a global scale (Goldfus,

2011). As a result of developments and changes in the 21st century, the way English is used has changed and speakers of other languages are expected to use English for more complicated tasks such as communicating complex ideas, cooperating internationally, and analyzing information that is changing quickly (Pardede, 2012; Warschauer, 2000). The key here is to actively use language by utilizing 21st century skills in the globalizing and digitalized world, rather than just using language to understand the messages. Therefore, the emphasis of English language teaching in the 21st century needs to shift from that of earlier times, when grammar, memorization of words, and mastery of language were the main foci of English language education, and deviate from conventional approaches in favor of integrating 21st century skills (Altan, 2017; Çınar, 2021; Pardede, 2020; Warschauer, 2000). As Fandiño Parra (2013) emphasized, teaching English and 21st century skills must coexist. Hence, English language teaching has gained significant ground lately (Goldfus, 2011). In line with this trend, MoNE (the Ministry of National Education of Turkey) introduced the most recent curriculum reform in 2017 across all academic areas, including English, to adapt to the 21st century (Altan, 2017). According to this reform, in order for English language learners to succeed in their future careers and everyday lives, they must be equipped with the skills that are essential in this era. As architects of tomorrow's world, teachers, especially teachers of English, are accountable for bringing these skills to their classes.

While it is highly crucial to begin promoting 21st century skills before university education (Demirkol-Orak & İnözü, 2021; Zivkoviç, 2016), to the best of researchers' knowledge, there have been no studies specifically investigating the integration of 21st century skills into secondary school lessons, particularly English lessons. Existing studies investigating 21st century skills in the field of English language teaching have focused on either the books if they include these skills (Akçay, 2019; Elgün, 2021) or the lecturers at university (Demirkol-Orak & İnözü, 2021; Ekinci, 2019;). Others have investigated teachers' 21st century skills practices at all levels, not specifically secondary school English language teachers (Eker, 2020; Kaçar, 2020; Otlu, 2020; Şahin, 2021; Yeni, 2018). In addition, although MoNE has made some adjustments to the curriculum and the qualifications of teachers to keep up with the age, there is not enough evidence on teachers' current practices. As Kirkgoz (2005) argues, there is usually a substantial gap between language policies and teaching methods, and hence, in this context, it is important to investigate teachers' current 21st century skills teaching practices. In order to shed light on teachers' practices, the challenges they experience were attempted to unveil based on the existing literature that has revealed some challenges when implementing 21st century skills (Anderson, 2020; Eker, 2020; Ekinci, 2019; Hardiman, 2020; Kaçar, 2020; Korkmazgil, 2015; Demirkol-Orak & İnözü, 2021; Pilpe, 2020; Rice, 2017; Stover, 2018; Wattanavorakijkul, 2019; Wilcox, Liu, Thall, & Howley, 2017). In this regard, the findings of the present study aim to address a gap in the literature by providing more details on the use of 21st century skills by secondary school English language teachers and the challenges they face when employing these skills in their teaching practices. In line with the aims of the present study, answers to the following research questions were attempted to seek:

1. Do English language teachers integrate 21st century skills into their teaching practices?
    a) Do they face any challenges as they do so? If yes, what?
2. Do secondary school English language teachers' 21st century skills teaching practices significantly differ based on their years of experience, the type of school they work in, their level of education, and whether they have received training on 21st century skills?

Method

Research Design

A mixed-methods design was employed in this study. In this design, both quantitative and qualitative methods are used in a single study (Fraenkel et al., 2012), thus providing the researchers more reliable data and giving more insight into the study's findings (Dörnyei, 2007).

Single survey and comparative survey models were utilized for the quantitative part of the current study. A single survey model comprises the determination of the variables in the research separately as type or amount (Karasar, 2015). In this model, variables are handled separately, and the obtained data can be evaluated by performing statistical analysis such as percentage, frequency, mean, and median. Through this model, teachers' average scores for the scale and subscale (eight 21st century skills) were illustrated. On the other hand, a comparative survey model is employed when the differences between two or more variables are investigated (Karasar, 2015). A comparative survey model was used in order to determine whether the use of 21st century skills differed significantly according to teachers' background variables.

A qualitative research model was carried out for the second part of the study, which includes an online survey with open-ended questions. Qualitative research model employs various data collection tools, such as interviews, observations, and documents, to present events in a realistic manner (Yıldırım & Şimşek, 2013). The present study employed an online survey to further the investigation and provide additional information and details complementing the quantitative data.

Participants

The present study was carried out with the participation of 119 secondary school English language teachers in Istanbul in the second semester of the 2020-2021 academic years. The participants were recruited using convenience sampling and snowball sampling methods. In convenience sampling, individuals who are easily accessible and available for the study are selected (Fraenkel et al., 2012). In snowball sampling, existing participants recommend others with suitable characteristics for the study, resulting in an increase in the number of participants required for the study (Fraenkel et al., 2012). The researcher used convenience sampling at first, then snowball sampling to include the rest of the participants. Table 1 shows the demographic profile of the participants.

Table 1. Demographic Characteristics of the Participants

		n
Years of experience	0-5	40
	6-11	34
	11-15	24
	15+	21
Training on 21st Century Skills	Yes	69
	No	50
School Type	Public	76
	Private	43
Level of Education	BA	102
	MA/PhD	17

For the second phase of the study, 26 teachers from the initial pool of 119 teachers voluntarily participated in the online survey. Eight of these teachers work in private schools, while the rest work in public schools. As this study was conducted during COVID-19, it made face-to-face interviews impossible. At this point, the online survey was implemented using Google Forms. Conducting online surveys offers various advantages. They can be seen as non-intrusive since participants are not required to travel to meet with a researcher or accommodate them at their home (Braun et al., 2021; Tracy, 2019). Moreover, without the societal influence that comes from a researcher being present in front of them, respondents in the online surveys have the flexibility to determine the duration, timing, and method of completing the survey (Braun et al., 2021).

Data Collection Tools

The research data were collected using the personal information form, 21st Teaching and Learning Scale, and an online survey. Detailed descriptions of these instruments are expounded upon in the subsequent sections.

Personal information form: This form was developed by the researchers. It includes four questions and aims to provide information about teachers' years of experience, their training on 21st century skills, the type of school they work in, and their level of education.

21st century teaching and learning scale: It was developed by Hixson et al. (2012). The scale has a high level of reliability (std. alpha > .90, inter-item correlations > .58). It is a five-point Likert scale, with 1 =Almost never, 2=A few times a semester, 3=1-3 times per month, 4=1-3 times per week, and 5=Almost daily. The scale contains eight factors and 48 items measuring teachers' 21st century teaching practices. There are two parts in the scale; in the first part of each subscale, the definition of the relevant 21st century skill is given, and the scale items come right after the definition. Providing definitions, according to Hixson et al. (2012), contributes to extremely reliable overall measures for each 21st century skill. The reliability of the scale was tested for this study. The Cronbach's alpha coefficient was found to be 0.97, which indicates that the reliability of the present study is very high (Kılıç, 2016).

The online survey: To answer the sub-question of the first research question, which investigates the challenges teachers encounter when implementing 21st century skills, an online survey was conducted with the participation of 26 secondary school English language teachers via Google Forms. The online survey was conducted in the

native language of the respondents to make them feel comfortable while writing their answers and to avoid misunderstandings. The questions of the online survey were prepared by the first researcher based on the existing literature (Anderson, 2020; Eker, 2020; Ekinci, 2019; Güvendir, 2017; Hardiman, 2020; Kaçar, 2020; Korkmazgil, 2015; Demirkol-Orak & İnözü, 2021; Pilpe, 2020; Rice, 2017; Stover, 2018; Wattanavorakijkul, 2019; Wilcox, Liu, Thall, & Howley, 2017). A pilot study was conducted with three teachers to assess the intelligibility of the questions. After the pilot study and expert view, the online open-ended survey questions were revised and conducted.

Data Collection Procedure and Analysis

Research data were collected in the second semester of the 2020-2021 academic year and lasted for three months. All necessary permissions were obtained from the Provincial Directorate of National Education. Both the scale and online survey were conducted through Google Forms due to COVID-19. The data were collected in two phases. Initially, the first researcher distributed the forms to the teachers she could contact directly. Subsequently, these teachers, in turn, forwarded the forms to their colleagues whom they knew. Thus, 119 secondary teachers were included in the study. 26 participants out of 119 teachers were recruited for the online survey by the first researcher. In the data collection tools, no information was requested from the participants that would reveal their identities.

Quantitative and qualitative analyses were performed on the data collected from teachers. SPSS 22 was utilized for the analysis of the quantitative data. Descriptive statistics were run to reveal if secondary school English language teachers integrate 21st century skills into their teaching practices. Besides, independent samples t-test and a one-way ANOVA were used to determine whether teachers' background variables have a role in the use of 21st century skills. Before performing relevant tests, Kolmogrov-Smirnorv normality test, which is used for data above 50 (Büyüköztürk, 2005), was run to see if the data had a normal distribution. The normality test showed that (p=0.200, p>0.05) the data had a normal distribution.

Content analysis was used to analyze the responses to the online survey. During analyzing the data, Elo and Kyngäs's (2008) steps were utilized. In this approach, the preparation phase comes first, and in this phase, the researcher selects a unit of analysis and familiarizes herself with the data until she is able to make sense of it as a whole. In the second phase, the data are coded according to emerging (inductive) or existing categories (deductive) in the current literature. Both deductive and inductive methods were used in the categorization of the codes. Categories are created in the deductive content analysis approach based on the existing literature or a theory, whereas in inductive, categories are created by the researcher based on the text, not the existing literature (Elo & Kyngäs, 2008). While forming the deductive data, the researcher kept various previously conducted studies (Anderson, 2020; Eker, 2020; Ekinci, 2019; Güvendir, 2017; Hardiman, 2020; Kaçar, 2020; Korkmazgil, 2015; Demirkol-Orak & İnözü, 2021; Pilpe, 2020; Rice, 2017; Stover, 2018; Wattanavorakijkul, 2019; Wilcox, Liu et al., 2017) in mind and categorized the data. Besides, the inductive approach was employed to create categories for the different points of view in the text. Table 2 shows which categories are deductive and which are inductive. To ascertain the reliability of the identified categories, the first researcher conducted a second round of data coding at a later time and utilized Cohen's Kappa analysis to assess the consistency between the two sets of codes. The achieved value is 0.89, indicating a high level of agreement between the codings and affirming the reliability of the coding process (Altman, 1999). In the final stage, the analysis of the data was presented in tables with frequencies and percentages of the categories.

Table 2. Deductive and inductive categories

Deductive categories	Inductive categotries
Those who need and do not need in-service training	Activities for 21st century skills
Insufficient curriculum	Up-to-date information on 21st century skills
Rote-based curriculum	Lesson planning with 21st century skills
Exam-oriented curriculum	Curriculum covering some 21st century skills
Adequate university education	Lack of practical knowledge
Partially adequate university education	Traditional row seating arrangements
Completely adequate university education	Large class size
University education that does not fit the real condition	Mixed-level students
Poor infrastructure	Support of MoNE
Lack of technological tools and materials	

Inadequate class hours
Supportive and unsupportive school administrators

Findings

The first research question investigated whether teachers integrate 21st century skills into their teaching practices. Descriptive statistics were employed to answer this question. The results were examined under eight 21st century skills, as shown in Table 3.

Table 3: The use of 21st century skills by teachers

	M	***S.D.***
The mean score of the whole scale	2.86	0.07
Sub-skills of the scale		
Using technology as a tool for learning	3.23	1.14
Collaboration	3.01	0.91
Creativity and innovation	2.85	1.00
Communication	2.79	0.89
Critical thinking	2.77	0.98
Self-direction	2.76	0.87
Global connections	2.65	0.98
Local connections	2.57	1.00

As Table 3 indicates, teachers employ 21st century skills approximately once or three times a month. When the use of sub-skills is examined, it is seen that the most addressed skill is using technology as a tool for learning (*M*=3.23), followed by collaboration skills (*M*=3.01). On the other hand, local connections are the least used skills (*M*= 2.57), and global connections are close to this result (*M*=2.65). Furthermore, the proximity of each sub-skill's standard deviation to 1 indicates significant variability in participants' responses.

As indicated by the descriptive results, the participants utilize 21st century skills with various frequencies. At this point, 26 teachers, chosen from the scale respondents, were asked if they encountered any challenges when integrating these skills into their teaching practices. The result of the sub-question related to the first research question is presented below.

Challenges Teachers Face in the Implementation of 21st Century Skills

As noted earlier, the existing literature reveals some challenges faced by teachers. In order to shed light on these challenges, the first researcher conducted an online survey with the participation of eight secondary private school teachers and eighteen secondary public school teachers of English. Teachers' names are presented as P1, P2, P3, etc. due to confidentiality.

In order to determine if they see any relationship between language teaching and 21st century skills, teachers were asked whether 21st century skills have importance in English language teaching. All of the teachers affirmed that 21st century skills teaching practices are of great importance in language lessons. The reasons for this are presented in Table 4.

Table 4. Reasons to integrate 21st century skills

Categories	***f***	**%**
Effective teaching	24	72.7
Keeping up with the age	9	27.3
Total	33	100

As evident from the table, educators perceive 21st century skills as vital for two distinct purposes; enchancing pedagogical effectiveness and keeping up with contemporary times.

"The integration of these skills is very important for the permanence of learning." (P8-Effective teaching)
"21st century skills are very important for the effective implementation of educational activities. Language is a form of communication, and keeping it up-to-date is essential for learning. Therefore, if we remove these skills, we lose the language." (P12-Effective teaching)

"With the effective use of 21st century skills, individuals who speak English gain significant advantages in their professional and daily lives in following the developments both in our country and in the world. In the 21st century, individuals need more than just language skills to advance in their education and professional lives. They need to be collaborative, able to handle complex situations, think creatively and critically, and appear confident." (P2-Keeping up with the age)

Teachers were asked if they needed in-service training on 21st century skill teaching practices and, if so, in which areas. Except for the nine teachers who did not respond, the answers of the rest are presented in Table 5.

Table 5. Teachers' in-service training needs

Categories	***f***	***%***
Those who need in-service training	15	88.2
Those who do not need in-service training	2	11.8
Total	17	100
Areas where teachers need in-service training		
Activities for 21st century skills	6	46.1
Up-to-date information on 21st century skills	5	38.5
Lesson planning with 21st century skills	2	15.4
Total	13	100

Most of the participants (88.2%) stated that they needed in-service tarinings on 21st century skills. Additionally, some of the respondents identified the areas in which they demand in-service training. Excerpts from the participants are as follows:

"As a teacher, I think we need in-service training in every field. It could be in terms of lesson planning and effective activities for 21st century skills." P6
"I prefer to receive in-service training on 21st century activities and skills and to update my knowledge." P7
"I would like to receive in-service training on up-to-date information on 21st century skills." P9
"I definitely need in-service training. Although I scanned foreign sources on this subject, time constraints, increased workload during COVID-19, etc. I couldn't even get online in-service training. I need training on lesson planning, which topics are chosen for which age group, and how to apply them in the lessons." P20

The teachers were also asked to evaluate the curriculum they teach in terms of its comprehensiveness in 21st century skills. The responses are illustrated in Table 6.

Table 6: Curriculum challenges

Categories	***f***	***%***
Insufficient curriculum	11	32.4
Rote-based curriculum	7	20.6
Curriculum covering some of 21st century skills	6	17.6
Exam-oriented curriculum	5	14.7
Curriculum covering all 21st century skills	5	14.7
Total	34	100

Only five of the teachers stated that the curriculum covers all of the 21st century skills. It is important to note that four of these teachers are from private schools and have the freedom to select the curriculum they would like to teach. An absence of 21st century skills in the curriculum refers to the curriculum that does not include any of these skills. A root-based curriculum means that the curriculum requires students to memorize the target words and grammar rules. Some teachers, on the other hand, pointed out that the curriculum includes some 21st century skills, but not all of them. Participants also indicated that the curriculum is exam-oriented and its only goal is to have students choose the best answer in the exam. Teachers' own responses are as follows:

"In particular, I think our books and units are definitely not sufficient for 21st century skills. Books are inadequate in terms of the information they provide." (P15-Insufficient curriculum)
"I don't think the curricula or textbooks on which we depend are inclusive of 21st century skills. I think it is based on rote learning and grammar, and I do not think it directs students to think critically, and even students find the curriculum boring." (P7-insufficient – rote-based curriculum)
"The curriculum supports greater use of communication and technology skills. However, I think that critical thinking and creativity are lacking in the curriculum." (P13-curriculum covering some 21st century skills)
"Unfortunately, since the curriculum is exam-oriented, I can't see much in terms of 21st century skills. In fact, I can say that there is nothing left in the name of critical and creative thinking among students. The questions are supposedly thought-provoking, but it seems impossible for learners to use their thinking skills unless they memorize certain patterns". (P19-exam-oriented and rote-based curriculum)
"We try to keep our curriculum as up-to-date as possible and it is designed to prioritize guiding our students to obtain information from reliable sources in a foreign language and to put collaboration and creative thinking at the center of the classroom." (P1-curriculum covering all 21st century skills)

Participants were asked to asssess the teaching practices related to 21st century skills in university education. The responses are listed in Table 7.

Table 7. The effectiveness of university education on 21st century skills

Categories	***f***	**%**
Adequate university education	13	48.2
Partially adequate university education	4	14.8
Completely inadequate university education	4	14.8
Education that does not fit the real conditions	3	11.1
Lack of practical knowledge	3	11.1
Total	27	100

The majority of the teachers stated that university education was satisfactory in terms of including 21st century skills. In addition, some of the participants pointed out that university education partially included these skills. On the other hand, some of the teachers indicated that university education was completely inadequate and did not include any 21st century skills. From a different angle, another quarter of the participants articulated that university education did not reflect the real condition of their present teaching situation. The rest of them stated that university education was theory-based and did not include any practical knowledge. The teachers' statements are as follows:

"In university education, our professors tried to teach us 21st century skills, and we were shown what kind of activities we could do for our students." (P20- Adequate university education)
"I have seen the positive effect of learning communication skills practices from 21st century skills, but I have not seen activities that support technology and creativity skills during my university education." (P18- Partially adequate university education)
"I did not receive any training in 21st century skills at university." (P7- Completely inadequate university education)
"We learned a lot about the teaching of 21st century skills in the courses at the university, but when the curriculum was insufficient in this regard, there were problems in the applications." (P13- Education that does not fit the real conditions):
"Frankly, the education you have received so far after graduation is generally theoretical, but with the in-service training we receive, you learn different methods, different techniques, and different activities." (P3- Lack of practical knowledge)

The participants were asked to indicate if they encountered any difficulties arising from classroom conditions during the implementation of 21st century skills. The categories are shown in Table 8.

Table 8. Conditions of classrooms

Categories	***f***	**%**
Poor infrastructure	8	29.7

Lack of technological tools and materials	5	18.5
Traditional row seating arrangements	4	14.8
No challenges	4	14.8
Large class size	3	11.1
Mixed-level students	2	7.4
Inadequate class hours	1	3.7
Total	27	100

The most stated problem was poor infrastructure for the internet and electricity. Lack of technological tools and materials was the second-most-mentioned problem. Teachers stated that they did not have the necessary teaching materials. Another problem, as stated by the teachers, is the widespread use of traditional row seating arrangements in schools. Only four of the participants stated there was no challenge arising from the classroom environment, and three of them were from private schools. Large class size, referring to crowded classrooms, is another issue raised by teachers. In addition, a small portion of the participants mentioned mixed-level students and inadequate class hours as challenges. The excerpts are presented below:

"Since cable, signal, etc. failures due to internet and technological disconnections take a lot of time and disrupt the motivation of children, there were times when I could not open the smart board, and I used communication and sharing skills with classical methods many times." (P18- Poor infrastructure)
"Unfortunately, our school does not have smart boards and computers for students. The use of projections and laptops is also restricted to the teacher. Activities and materials that develop 21st century skills are not available. Teaching these skills is restricted to teachers' personal interests." (P20-Lack of technological tools and materials)
"My main problem is that although the classrooms are equipped with all technological and student-oriented facilities, the classroom row seating arrangement still continues in the old way. I think that a classroom environment that fully supports 21st century skills should be arranged in such a way that students can communicate comfortably with each other, not classrooms that make students turn their backs on each other." (P1- Traditional row seating arrangements)
"Since I work in a private institution, I have no problem with this. In some of my classes, I even ask students to bring a phone or tablet to play games like Kahoot." (P2-No Problem)
"As a different example, the large number of classes in some classes can turn into a disadvantage when including collaboration skills." (P17- Large class size)
"Language teaching should be according to the language level (A1 etc.), not according to the grade level. This should be fixed." (P5- Mixed-level students)
"Sometimes the inadequate class hours can negatively affect our communication, critical thinking, and discussion skills." (P17- Inadequate class hours)

Teachers were asked about their institutions' attitudes towards integrating 21st century skills into lessons. The responses are presented in Table 9.

Table 9. School administrators' attitudes towards 21st century skills

Categories	***f***	**%**
Supportive school administration	15	60
Unsupportive school administration	7	28
Support of MoNE	3	12
Total	25	100

The majority of the participants stated that school administrators' attitudes are favorable, and they support teachers in terms of integrating 21st century skills into lessons. Conversely, seven of the participants claimed that the school administration is unaware of these skills and tends to favor the more conventional approach, which prevented teachers from bringing 21st century skills into their lessons. The rest of the participants, on the other hand, made reference to the Ministry of National Education support rather than the school administrators. Teachers' statements are presented below:
"My school has always supported me in this area and tried to help me financially and morally." (P9- Supportive school administration)

"It cannot be said that the school administration supports this. There are more traditional methods of rote-learning." (P10- Unsupportive school administration):
"National education has been providing in-service training on this subject recently. I think 21st century skills are on the agenda." (P13- Support of MoNE).

The Role of the Participants' Demographic Profile

A one-way ANOVA test was conducted for each sub-skill to determine whether or not teachers' 21st century skills teaching practices differ significantly according to their years of teaching experience. Table 10 illustrates the findings. According to the analysis, teachers' years of experience do not play a significant role in their use of creativity and innovation skills, self-direction, global connections, and local connections (p>0.05). On the other hand, teachers' use of critical thinking, collaboration, communication, and using technology as a tool for learning teaching practices differs significantly according to teachers' years of experience.

In order to find out which groups caused a significant difference in the use of critical thinking skills in teaching practices, an LSD post-hoc test was run. The analysis showed that 6-10 years, 11-15 years, and 15+ years caused this difference. It has been uncovered that teachers with 6-10 years of experience (M=3.14) employ critical thinking skills more than those with 11-15 (M=2.42) and 15+ (M=2.42) years of experience.

Considering that homogeneity variances were significant at the 0.05 level, the results of the Dunnett T3 post-hoc test were analyzed to identify the groups that make the difference in the use of collaboration skills in teaching practices. The analysis indicated that this difference is due to those teachers with 6-10, 11-15, and 15+ years of experience. The mean scores of those teachers illustrate that teachers with 6-10 years of experience (M=3.15) integrate these skills more frequently than those with 11-15 (M=2.66) and 15+ years of experience *(*M=2.67).
Since the homogeneity of variances was significant at the level of 0.05, a Dunnett T3 post-hoc test was run to determine which group caused the difference in the use of communication skills in teaching practices. According to the results, teachers with 6-10 and 11-15 years of experience make the difference. Teachers with 6-10 years of experience (M=3.32) employ communication skills more than those with 11-15 years of experience (M=2.45).

Lastly, the LSD post-hoc test revealed that those with 6-10 and 15+ years of experience make the difference in using technology as a tool for learning. The mean scores of the participants point out that teachers with 6-10 years of experience (M=3.60) infuse technology as a tool for learning into their teaching practices more than those with 15+ years of experience (M=2.73).

Table 10. ANOVA findings regarding teachers' years of experience

	Years of experience	***N***	***M***	***S.D.***	***F***	***p***	**Significant Difference**
Critical Thinking	0-5years	40	2.85	1.018	3.887	.011	6-10>11-15, 6-10>15+
	6-10 years	34	3.14	.96			
	11-15 years	24	2.42	.73			
	15+ years	21	2.42	1.01			
Collaboration	0-5 years	40	3.15	.99	4.032	.009	6-10>11-15 6-10>15+
	6-10 years	34	3.23	.95			
	11-15 years	24	2.66	.66			
	15+ years	21	2.67	.71			
Communication	0-5 years	40	2.75	.89	4.767	.004	6-10>11-15
	6-10 years	34	3.23	.92			
	11-15 years	24	2.45	.54			
	15+ years	21	2.56	.96			
Creativity and Innovation	0-5 years	40	2.94	.92	1.567	.201	
	6-10 years	34	3.07	1.13			
	11-15 years	24	2.58	.85			
	15+ years	21	2.63	1.05			
Self-Direction	0-5 years	40	2.79	.87	1.621	.188	
	6-10 years	34	2.99	.96			
	11-15 years	24	2.59	.66			

	15+ years	21	2.53	.87			
Global Connections	0-5 years	40	2.70	.96			
	6-10 years	34	2.88	1.03	1.607	.192	
	11-15 years	24	2.33	.72			
	15+ years	21	2.53	1.14			
Local Connections	0-5 years	40	2.64	.97			
	6-10 years	34	2.78	1.10	1.393	.248	
	11-15 years	24	2.35	.84			
	15+ years	21	2.33	.96			
Using Technology	0-5 years	40	3.28	1.17			6-10>15+
	6-10 years	34	3.60	1.14	2.810	.043	
	11-15 years	24	3.08	.87			
	15+ years	21	2.73	1.21			

An independent t-test was conducted to explore the potential influence of teachers' background variables, including the type of school they are employed in, their level of education, and 21st century skills training, on the utilization of these skills.

Table 11 illustrates that the use of critical thinking, communication, creativity and innovation, self-direction, global connections, and using technology as a tool for learning differ significantly by the type of school teachers work in (p<0.05). On the other hand, the type of school teachers work in is not of significant value in the teaching practices of collaboration skills and local connections (p>0.05). Teachers' mean scores indicate that those working in private schools integrate critical thinking (*M*pr=3.06, *M*pub=2.61), communication (*Mpr*=3.20, *M*pub=2.56), creativity and innovation (*M*pr=3.32, *M*pub=2.58), self-direction (*M*pr=3.00, *M*pub=2.67), global connections (*M*pr=2.93, *M*pub=2.49), and using technology as a tool for learning (*M*pr=3.64, *M*pub=3.01) skills into their lessons more than those working in public schools.

Table 11. T-test results regarding types of school

21st century skills	**Types of School**	***N***	***M***	***S.D.***	***df***	***t***	***p***
Critical Thinking	Public	76	2.61	.95	117	-2.427	.017
	Private	43	3.06	.98			
Collaboration	Public	76	2.90	.93	117	-1.792	.076
	Private	43	3.21	.85			
Communication	Public	76	2.56	.87	117	-3.936	.000
	Private	43	3.20	.79			
Creativity and Innovation	Public	76	2.58	.89	117	-4.085	.000
	Private	43	3.32	1.03			
Self-Direction	Public	76	2.67	.88	117	-2.322	.022
	Private	43	3.00	.80			
Global Connections	Public	76	2.49	.93	117	-2.366	.020
	Private	43	2.93	1.01			
Local Connections	Public	76	2.46	.99	117	-1.634	.105
	Private	43	2.76	.96			
Using Technology	Public	76	3.01	1.13	117	-2.988	.003
	Private	43	3.64	1.06			

According to the t-test results shown in Table 12, the use of critical thinking, communication, creativity and innovation, self-direction, global connections, and local connections skills in teaching practices differ significantly based on the training teachers received on 21st century skills (p<0.05). Besides, no significant difference was detected in the use of collaboration skills and using technology as a tool for learning teaching practices (p>0.05). Teachers' mean scores show that those receiving training use critical thinking (*M*yes=2.98, Mno=2.49), communication (*M*yes=2.96, *M*no=2.57), creativity and innovation (*M*yes=3.02, *M* no=2.61), self-direction

(*M*yes=2.97, Mno=2.48), global connections (*M*yes=2.81, *M*no=2.42), and local connections (*M*yes=2.73, *M*no=2.35) more often than those who did not.

Table 12. T-test results regarding 21st century skills training

21st century skills	**Training**	***N***	***M***	***S.D.***	***df***	***t***	***p***
Critical Thinking	Yes	69	2.98	1.01	113.785	2.835	.005
	No	50	2.49	.87			
Collaboration	Yes	69	3.13	.90	117	1.635	.105
	No	50	2.86	.90			
Communication	Yes	69	2.96	.97	116.971	2.505	.014
	No	50	2.57	.71			
Creativity and Innovation	Yes	69	3.02	1.03	117	2.225	.028
	No	50	2.61	.94			
Self-Direction	Yes	69	2.97	.86	117	3.148	.002
	No	50	2.48	.80			
Global Connections	Yes	69	2.81	1.00	117	2.180	.031
	No	50	2.42	.91			
Local Connections	Yes	69	2.73	.98	117	2.085	.039
	No	50	2.35	.96			
Using Technology	Yes	69	3.37	1.18	117	1.549	.124
	No	50	3.05	1.06			

As seen in Table 13, there is no significant difference in employing 21st century skill teaching practices according to the education level of the participants ($p>0.05$).

Table 13. T-test results regarding the education level of teachers

21st century skills	**Education Level**	***N***	***M***	***S.D.***	***df***	***t***	***p***
Critical Thinking	BA	102	2.71	.93	19.276	-1.285	.214
	MA/PhD	17	3.11	1.22			
Collaboration	BA	102	2.98	.87	19.482	-.973	.343
	MA/PhD	17	3.25	1.10			
Communication	BA	102	2.78	.87	117	-.357	.722
	MA/PhD	17	2.87	1.02			
Creativity and Innovation	BA	102	2.82	.98	117	-.748	.456
	MA/PhD	17	3.02	1.14			
Self-Direction	BA	102	2.72	.86	117	-1.249	.214
	MA/PhD	17	3.00	.91			
Global Connections	BA	102	2.60	.98	117	-1.134	.259
	MA/PhD	17	2.90	.99			
Local Connections	BA	102	2.53	.96	117	-.921	.359
	MA/PhD	17	2.77	1.16			
Using Technology	BA	102	3.21	1.13	117	-.612	.542
	MA/PhD	17	3.39	1.19			

Discussion and Conclusion

The present study primarily investigates whether secondary school English language teachers integrate 21st century skills into their teaching practices and, if so, what challenges they face. Additionally, how teachers' demographic variables play a role in their use of these skills was unveiled.

The descriptive statistics were run to answer the first research question, which sought to investigate if the participants employ these skills in their lessons, and it was concluded that teachers integrate 21st century skills into their lessons approximately once or three times per month. In her study with vocational high school teachers, Erten (2022) also stated that teachers usually use 21st century skills in their lessons. Besides, it was revealed that

using technology as a tool for learning is the most addressed 21st century skill by the participants. There are other studies with similar findings in the literature (Ekinci, 2019; Gürültü et al., 2019; Otlu, 2020; Şahin, 2021). These findings are not surprising because ICT advances have altered how people work and learn, and integrating technology into teaching practices has become a fundamental tool for 21st century teaching and learning (Trilling & Fadel, 2009; Voogt et al., 2013). Despite the widespread use of technology, there are some studies with conflicting results (Ahmad et al., 2019; Ghamrawi et al., 2017; Hardiman, 2020; Tindowen et al., 2017; Wattanavorakijkul, 2019; Wilcox et al., 2017). The study by Hardiman (2020) showed that despite the fact that all schools have access to technology, primary and secondary school teachers do not instruct students on how to develop 21st century technological skills. These conflicting results in the literature might be caused by the fact that, as Hardiman (2020) points out, teachers lack the in-service training they need to use technology effectively in the classroom. According to the qualitative data findings of the present study and the study by Anderson (2020), there may be additional causes for this, such as inadequate infrastructures and the inability to access technology. Unlike the use of technology, the findings showed that local connections represent the least utilized 21st century skill. Similarly, Otlu (2020), in her study of 181 teachers of English, revealed that local connections were the least employed skills. Ghamrawi et al. (2017) also found that local connections are one of the rarely used 21st century skills by Lebanese secondary school teachers. There are other studies in the literature that support these findings (Gürültü et al., 2019; Hardiman, 2020; Rice, 2017; Tindowen et al., 2017; Wattanavorakijkul, 2019). On the other hand, Yang (2019) asserts that it is essential to practice local connections in lessons since familiarity with the subjects in the local environments increases learners' engagements. Supporting Yang's view, Cheng (2002) suggested that when teaching a particular subject, teachers should highlight the importance of content that is rooted in a cultural or regional setting. Local connections can be integrated into lessons through the cooperation of schools and the community to achieve specific objectives (Rice, 2017).

In addition to the 21st century skill teaching practices, the challenges encountered by teachers in employing these skills were also investigated as a sub-component of the first question within the scope of this study. For language teaching to remain relevant or be effective, all teachers agreed that 21st century skills must be included. Similar findings have been seen in the literature regarding the fact that teachers of English accept the importance of 21st century skills in language teaching (Demirkol-Orak & İnözü, 2021; Eker, 2020; Ekinci, 2019; Kaçar, 2020). Although teachers of English acknowledge the importance of using these skills in lessons, they also reported some challenges that prevented them from integrating these skills. One of these challenges, as stated by the majority of participants, is the lack of in-service training, and they especially need activities and up-to-date information about 21st century skills. Studies in the literature also support this finding (Anderson, 2020; Eker, 2020; Hardiman, 2020; Kaçar, 2020; Korkmazgil, 2015; Pilpe, 2020; Stover, 2018). Eker's (2020) study revealed that despite achieving high average scores in knowledge and awareness of 21st century learning and innovation skills, teachers emphasized their lack of experience and training to enhance their understanding and practical application of these skills. These findings may be due to the insufficient number of in-service training offered to the teachers of English by the MoNE. According to Korkmazgil (2015), out of a total of 6516 training programs in the last ten years, MoNE has only created 127 ELT (English Language Teaching)-specific- in-service training program. Undoubtedly, effective professional development is essential to ensuring that teachers have the tools they need to modify their teaching practices (Tour, 2017).

Another challenge voiced by teachers is that 21st century skills are not sufficiently covered in the curriculum. Only five teachers, four of whom work in private schools, stated that the curriculum sufficiently covered these skills. Additionally, participants reported that the curriculum and books are exam-oriented and centered on rote-based learning. Similar findings are also found in other studies in the literature (Demirkol-Orak & İnözü, 2021; Erten, 2022; Güvendir, 2017; Hardiman, 2020; Kaçar, 2020; Korkmazgil, 2015). Confirming the views of teachers, Elgün's (2021) research indicates that 8th grade English books only cover a very small portion of 21st century skills. Therefore, there is a need for curriculum development, with greater inclusion of 21st century skills in textbooks. In addition, in his study, Bedir (2017) noted that despite teachers' willingness and interest in incorporating 21st century skills into their teaching practices, constraints imposed by curriculum requirements and a strict culture of test-basement assessment have hindered the integration of these skills into lessons. There is a consistent pattern suggesting that the insufficient emphasis on 21st century skills within the curriculum leads to inadequate incorporation of these skills by teachers in their lessons (Voogt et al., 2013).

Participants also mentioned some challenges stemming from their university education, including the following: inadequate preparation for employing 21st century skills; university programs that do not align with real-world conditions; and instructions guided by theory. A similar finding is found in Güvendir's (2017) study, which indicated that a university degree falls short of meeting teachers' actual needs. Besides, the participants of the current study stated that the university education did not provide them with any training in 21st century skills.

According to Wagner (2008), the majority of college students need remedial courses in 21st century skills because the curriculum in college is information-based and the emphasis is placed on knowledge acquisition. Ghamrawi et al. (2017) and Pilpe (2020) also revealed in their studies that since teachers are educated using 20th century teaching paradigms, teacher training programs need reform in terms of 21st century skills. Consistent with the literature, the inadequate curriculum and 20th century teaching paradigm may explain why teachers were not adequately trained in 21st century skills at the university level. This lack of training obviously makes it difficult to current teachers to employ these skills in their teaching practices.

The majority of the participants also mentioned various challenges related to the classroom setting, including poor infrastructure, a lack of technological tools and equipment, and a large class size. Kaçar (2020) also found that English language teachers struggle with inadequate infrastructure and internet connection, which has an impact on their ability to teach effectively. Another study conducted by Korkmazgil (2015) suggested that English language teachers who work in public schools struggle with a lack of necessary supplies and overcrowded classrooms. These results are supported by other studies in the literature (Anderson, 2020; Rice, 2017; Şahin, 2021). As Khawaji (2016) noted, there is a strong relationship between technology integration and teachers' access to computers and resources, the stage of the implementation process, their use of technology, and their level of competence. Consequently, it is crucial that the necessary technological tools and infrastructure be made available for teachers to effectively employ 21st century skills.

Whereas more than half of the teachers stated that their administrators supported the teaching of 21st century skills, the rest emphasized that their administrators were less inclined to supoort teaching 21st century skills and were more in favor of traditional teaching. In a similar vein, Hardiman's (2020) study on middle school teachers revealed that administrators were unaware of 21st century skills and were not sure that these skills were being used on all of their campuses. Demirkol-Orak and İnözü (2021) also asserted in their study that English language lecturers are ready to practice and increase the implementation of 21st century skills in their classes when they have administrative support in terms of organizing professional development to bridge the knowledge gap about these skills. It is a fact that teachers are challenged by the unsupportive attitude of administrators and their lack of knowledge about 21st century skills.

When it was investigated if teachers' demographic variables played a role in 21st century skills teaching practices, it was found that the use of these skills significantly differed according to the years of experience of the teachers. Post-hoc tests showed that teachers with 6-10 years of experience employ these skills more frequently than those with 11-15 and 15+ years of experience. In a similar vein, Şahin (2021) found that English language teachers with more years of experience reported more problems with using technology in the classroom. According to Embi (2007), older teachers are the ones who regard themselves as being less inclined to use information technologies, and he attributed this situation to their avoidance of age-related technology. On the other hand, Kavukçu's (2021) study uncovered that teachers with 16 years and more years of experience have higher-level media and technology knowledge and skills than those with 6-10 years of experience. In addition to these studies, there are also studies in the literature that revealed that there is no difference between 21st century skills teaching practices and the length of service of teachers (Erten, 2022; Gürültü et al., 2019; Kaçar, 2020; Otlu, 2020). It can be concluded that the age of teachers may be a factor in the use of 21st century skills, and while planning the integration of these skills into language lessons, this factor should be taken into account.

The present study also revealed that there was a noticeable difference in the use of 21st century skills depending on whether teachers were in public or private school. Post-hoc tests indicated that, apart from collaboration skills and local connections, private school teachers employed 21st century skills more often than public school teachers. Otlu (2020) also obtained the same results in her study with teachers of English. There are some reasons behind these findings. One of the reasons for this situation, as revealed in Babanoğlu and Yardımcı's (2017) study, is that private school teachers tend to engage more in their proffesional development compared to their counterparts in public schools. This disparity arises because private schools often encourage their staff to be creative, responsible, and to employ advanced language teaching methods. This is largely driven by the competitive and profit-driven nature of private schools. Also, they use student success as a tool to promote themselves. Other studies in the literature also found that private school teachers use more differentiated instructions (Butt & Kausar, 2010) and have a higher quality of teaching than public school teachers (Rahimi & Nabilou, 2011). These reasons may stem from challenges commonly encountered in public schools, including overcrowded classrooms, teacher training deficiencies, extensive syllabi, limited access to technology resources, and insufficient class hours (Butt & Kausar, 2010; Rahimi & Nabilou, 2011). The result of the online survey also indicated that, unlike public school teachers, private school teachers reported no issues regarding the learning environment and curriculum, and private school teachers stated that they had freedom in choosing their own curriculum and books.

When investigating the role of training in 21st century skills on teachers' teaching practices, the findings of the current study showed that, apart from collaboration skills and using technology as a tool for learning, teachers who have received training integrate 21st century skills into their teaching practices more often than those who have not. Kaçar (2020) also, in his study with 190 teachers of English, revealed that teachers who participated in a training on 21st century skills had a more positive perception of 21st century innovation skills than those who did not. Furthermore, an experimental study conducted by Yeni (2018) with the participation of 33 teachers of English showed that teachers' practices and perceptions of the 21st century changed positively after they received training on 21st century skills. The results are not unexpected because professional development, as noted by Jackson and Andrew (2000), is a crucial tool that teachers can engage in both inside and outside of the school setting to expand their knowledge, understanding, and practice of these skills. Also, according to Chai and Kong (2017), the professional development of teachers is an important component for 21st century education.

The findings also revealed that there was no significant difference in the skill teaching practices of 21st century teachers based on their educational backgrounds. There are studies in the literature suggesting that teachers' educational background does not play a role in 21st century teaching (Anderson, 2021; Cemaloğlu, Arslangil, Üstündağ, Bilasa, 2019; Kavukçu, 2021; Şahin, 2021). On the other hand, Otlu's (2020) study indicated that English language teachers with postgraduate degrees employ global connections more than those with undergraduate degrees. Another study by Çelebi and Sevinç (2019) with 130 secondary school teachers revealed that teachers with postgraduate degrees have higher efficacy perceptions of 21st century skills. It is seen that there are different results between teachers' 21st century skill teaching practices and perceptions and their educational background. The disparity in participant qualifications among post graduate teachers in the present study may explain this result. While 86% of the participants have undergraduate degrees, only 14% of them hold postgraduate degrees.

Based on the results, it can be concluded that teachers integrate 21st century skills to some extent and, they are aware of the importance of these skills in the contemporary era. However, it is also revealed that teachers face some challenges when integrating these skills. These challenges prevent them from using these skills in their lessons. It is reasonable to suggest that the policy of the MoNE and teachers' actual practices are not compatible for a number of pragmatic reasons. Although MoNE (2013, 2018) encourages the incorporation of 21st century skills in some way, teachers do not spend enough time or attention to integrate these skills into their teaching practices.

Suggestions

As stated earlier, for nations to function and thrive successfully in the 21st century, 21st century skills must be integrated into education. The use of these skills by teachers can be determined by investigating their current teaching practices. In this regard, the findings of the present study shed light on this issue and have some suggestions for practice and further studies.

First of all, as the majority of the teachers emphasized in the online survey, in-service training should be offered to teachers of English in secondary schools in order to raise their knowledge and integrate 21st century skills. In this study and in the literature, it was revealed that teachers who received in-service training employed these skills more frequently than those who did not. In this regard, in-service training is the backbone for better implementation of these skills.

As P21 (2017) suggests, the curriculum should also be modified according to 21st century skills, and curriculum designers should develop objectives that reflect a more comprehensive and intensive inclusion of these skills in the curriculum. Relatedly, teachers also voiced concerns about the curriculum's and books' emphasis on exams. The foundation of 21st century skills, according to Wagner (2008), is assessment, and you get what you test. In this regard, exams should focus more on 21st century skills and place more emphasis on the process.

As both quantitative and qualitative data findings indicate, private school English language teachers use 21st century skills more frequently and have better conditions than public school teachers. Accordingly, in terms of the setting and resources used in the classroom, public school teachers should have equal working conditions with their private school counterparts in order to employ 21st century skills in the best way. It is necessary to conduct a needs analysis and provide the necessary resources and infrastructure.

Some of the participants also made reference to how inadequate their university education had been in terms of gaining 21st century skills. The faculty of education has a significant role in introducing 21st century skills and teaching how to integrate these skills into lessons. Pilpe (2020) also highlighted that teachers who were educated using the paradigm of the 20th century themselves can not effectively teach these skills.

In addition to teachers, school administrators should also become more informed and have their attitude changed through the professional development offered by MoNE. It should be ensured that they support teachers in implementing 21st century skills.

Convenience and snowball sampling methods were used in the current study and were conducted with the participation of a limited number of teachers; therefore, future studies should use one of the probability sampling methods and reach a wider group of teachers in order to decrease the probability and increase the generalizability of the findings.

Although this study utilized an online survey due to the pandemic, which has certain advantages, future researchers should use face-to-face interviews to obtain more thorough responses and ask participants more follow-up questions.

In this study, teachers' 21st century skill teaching practices were investigated. Hence, further research can be conducted on the students' side, and classroom observations can be used to deepen the study. Additionally, as mentioned earlier, it is crucial that teaching 21st century skills be integrated into lessons from the early years of education; therefore, the quality of 21st century skills teaching in primary schools should also be investigated.

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Explanation of Subjective Well-Being from School Burnout or Sensation Seeking: Which is the Biggest Predictor for Religious Students

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Abstract
This study establishes a clear correlation between positive and negative emotions, subjective well-being, school burnout, and sensation seeking in religious students. The survey design employed a cross-sectional technique on a convenience sample of 205 religious students. The data was collected using the classical arrangement of each class in the school after obtaining approval for research procedures and ethical codes from the research institute. Data collection instruments included the Positive Affect Negative Affect scale, School Burnout Inventory, and Brief Sensation-seeking. The study results confidently indicate that positive emotions have a negative relationship with school burnout, but at the same time, a stronger positive relationship with school burnout than negative emotions. Sensation seeking is a significant predictor of both positive and negative emotions. Therefore, it is reasonable to hypothesize that sensation seeking may mediate the relationship between positive and negative variables. Further research is needed to confirm this hypothesis. The implications and suggestions have been discussed in this study.

Keywords: Positive affection, Negative affection, Burnout, Sensation seeking

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Introduction

Religious schools in Indonesia, also known as 'pesantren' or boarding schools, focus solely on the study of Islam. They effectively shape the character of their students, known as 'santri', by instilling religious values and promoting independence (Oktari & Kosasih, 2019; Syafe'i, 2017). Religious students differ from public school students in terms of religiosity, but not in emotional stability (Rahmatillah, 2022). Literature suggests that religious students generally have good welfare due to their social relations (Nindya, 2022), self-worth, and closeness to God (Muliadi & Hidayat, 2022), indicating their possession of strong religious values compared to students in regular schools.

Religiosity is generally considered positive, but it is important to recognize that students are still teenagers who may be susceptible to delinquency. These negative behaviors can have a detrimental effect on their enthusiasm for learning. However, by acknowledging and addressing these issues, we can help students restore their mental stability and avoid engaging in harmful behaviors. As experts in education, we have the tools and knowledge to guide students towards positive outcomes. In 2022, students face various pressures, including religious school regulations imposed by higher classes, which can lead to bullying of lower classes (Emilda, 2022; Hesfi & Sofia, 2022). Although new students may experience high levels of emotional stress due to bullying and adjusting to new environments (Roihanah & Arsy, 2022), it is important to note that some argue that bullying can have positive effects (Ulum, 2021).

Religious students experience negative emotions due to perceived lack of success in their education (Ismiradewi et al., 2021). Attending religious schools has a significant impact on the welfare of these students (Rohayati et al., 2022). According to Munif et al. (2021), pursuing education during the pandemic can be achieved without the need for psychological services for prevention and treatment within religious schools. However, Nurina & Hermatasiyah (2022) suggest that the absence of such internal services may lead to increased stress or pressure among students undergoing education in religious schools. According to research conducted by Zahara et al. (2022) and Khairiyah et al. (2022), individuals with self-regulation abilities can effectively manage stress or pressure by focusing on regulating their own emotions, as suggested by Hasanah and Sa'adah (2021). It is important to note that this approach does not require changing the problems that may arise.

The pressure felt by religious students in the academic process repeatedly can cause emotional exhaustion and the presence of a state of cynicism where this concept is also called burnout. This concept was originally explained in an industrial and organizational context (Maslach & Jackson, 1981) but as burnout research develops, currently feeling tired and cynical is not only felt and occurs in a worker in a human and industrial service environment but also experienced by students (Fahmi & Widyastuti, 2018) so that in this case religious students can also feel burnout because school is the context in which they work because they have to comply with all the rules and make certain achievements from what is expected from the education provider.

Religious students experience emotional exhaustion and cynicism, but they also have their own way of recognizing positive and negative emotions, commonly referred to as subjective well-being. This concept is crucial in one's life. Religious students can improve their well-being through various methods. They must maintain motivation and carry out activities in life to achieve happiness.

Subjective well-being is a term that is closely related to happiness (Dewi & Nasywa, 2019) and this concept is included in positive psychology studies (Akhtar, 2019) and in it there are three broad categories to explain broader subjective well-being, namely virtue or chastity, life satisfaction, and positive affect are greater than negative (Diener, 1984) but now broadly speaking this concept is divided into two parts, namely the concept of positive and negative affect so that it is included in the bipolar concept. At present we can be sure that in general everyone in search of happiness will be divided into two types, namely those who seek happiness in negative ways and there are also positive ones. The negative way is those who seek happiness but cause ugliness on the other side, for example students who want high grades on assignments or exams but don't study so as to meet the need for these values they prefer to do bad or harm themselves and other people such as cheating or being dishonest in seeking that value. While the positive way is those who really work hard to study in order to get high scores.

On the other hand, religious students are also ordinary people and they are still in a period of physical and psychological development, so it is quite common to see religious students being punished in religious schools. Small violations are quite routine and major violations are always there even though they are rare and this explains that religious students participate or respond to many stimuli and cannot control them to be able to always fulfill their experiences (Zuckerman et al., 1964). So that it can be ascertained that this concept is also called sensation

seeking which occurs in religious students in a religious school as Zuckerman explains that sensation seeking is an individual trait characterized by a continuous desire to seek sensations and experiences that are complex, always new, and intense, and also the willingness to take physical, social, legal, and financial risks to get there. So that is the main point.

Previously it was explained that subjective well-being can provide variations in the rise or fall of burnout in academics like previous literature which explains that subjective well-being is positively related to a student's academic achievement (Salekha & Suryati, 2020) and negatively related to a student's academic stress. (Achmad & Wahyudi, 2022). Religious students are said to be prosperous because of their high religiosity and of course this is academic achievement in religious schools but at the same time experiencing burnout so this leads to the question in this study, namely whether the concept of positive and negative affection from subjective well being is related to burnout and sansation seeking?

The first hypothesis (H1) proposed in this study is that there is a negative relationship between positive emotions from subjective well being and burnout. Meanwhile, the second hypothesis (H2) proposed in this study is that there is a positive relationship between negative emotions from subjective well being and burnout. The positive and negative correlations proposed are based on several previous studies which explain that quite a lot have accepted their alternative hypothesis by accepting that there is a negative relationship between subjective well being and burnout. This relationship can be proven from a variety of samples such as teachers (Andriany et al., 2021) workers such as male and female doctors (Wang et al., 2020) and hospital workers (Jia et al., 2021) field workers such as police (Lan et al. al., 2021) and of course students (Gundogan, 2022).

Method

Prosedure

The procedures and code of ethics in this study were approved by the code of ethics committee from the Faculty of Psychology from Medan Area University with approval letter No: 72/FPSI/02.5/V/2022. The purpose of this study is to explain the positive and negative affective relationships of subjective well-being related to burnout and sansation seeking in religious students as the sample. data collection was carried out directly in the classroom classically in the morning by cross-sectional method.

Partisipants

The sample in this study was taken from religious students at "*Sabilul Mukminin*" religious school with a total of n = 205 religious students. This study is non-parametric with non-probability sampling so that the samples in this study are those who feel comfortable filling out an informed consent form to follow it to completion or how to choose the sample which is commonly called convenience sampling. All samples collected were in the 2nd grade of high school and all of them were boys aged between 16 or 17 years. Because the sampling location is an Islamic boarding school, then boys and girls are not in the same area (school and dormitory).

Measurment

This study uses the positive affect negative affect schedule scale to see positive and negative affect on the sample, where this scale is also a bipolar scale which describes the two positive and negative poles, each consisting of 10 items. Then the sample is asked to respond to different emotional states. happened in the last week. As for examples of items in positive emotions, namely "excited" while examples of negative items are "upset". This scale contains 20 items ranging from 1 = (almost never) to 5 = (almost always). The items are a set of positive and negative words that will describe the emotional situation of the sample in the past week with a consistent alpha value for each item that is on average greater than eight (α=>.08) (Akhtar, 2019).

Then, using the school burnout inventory scale which consists of the emotional exhaustion factor which consists of 5 items and cynicism which consists of 4 items (Rahman, 2020). As for one item of emotional exhaustion, namely "I feel overwhelmed with school/college assignments" while for the example of a cynicism item, namely "I feel I have lost interest in completing school/college assignments". The desired response on this scale starts from the range 1 = (strongly disagree) to 5 = (strongly agree).

then there is the brief sensation-seeking scale which is formed from four factors, namely Thrill-seeking, Experience seeking, Boredom susceptibility, Disinhibition (Bagaskara, 2021). Overall there are 8 items with an example of

one item from Experience seeking namely "I want to visit various foreign places" and the responses to answers from this scale start from the range 1 = (strongly disagree) to 5 = (strongly agree).

Results

Religious students responded most positively to the variable of positive emotion, while sensation seeking was the lowest. All variables remained within the normal category based on the slope and sharpness of the data. All variables have sufficient alpha values, including Boredom susceptibility, which is part of the Sensation seeking variable. While it may be considered inconsistent, this variable is still a factor of the main variable and therefore should be included in the analysis of this study.

Overall, the average empirical data of the positive emotion variable of religious students is included in the high category (M = 33, SD = 6.06) with the lowest average distance of 14 to the highest of 49. In contrast to the results of the empirical average of negative emotion variables which is included in the moderate category (M = 28, SD = 7.25) with an average distance of the lowest score 11 to the highest score of 48. Likewise with the empirical average of the school burnout variable which is also included in the moderate category (M = 30, SD = 7.17) with the lowest average distance of 13 to the highest value of 52. Then finally there is the average of the sensation seeking variable which is included in the high category (M = 25.5, SD = 38) with the lowest average distance of 11 up to a high of 38.

Table 1. Description of each variable

Variabel	M	SD	S	SES	K	SEK	α
Positive emotional	33.044	6.068	-0.261	0.17	0.16	0.338	0.763
Negative emotional	28.327	7.25	0.157	0.17	-0.136	0.338	0.83
School burnout	30.01	7.173	0.15	0.17	0.424	0.338	0.805
Emotional Exhaution	17.205	3.929	-0.05	0.17	0.734	0.338	0.594
Cynism	12.805	3.945	0.166	0.17	0.037	0.338	0.777
Sensation seeking	25.498	5.107	0.039	0.17	-0.015	0.338	0.702
Experience seeking	7.107	1.804	-0.369	0.17	-0.135	0.338	0.547
Boredom susceptibility	5.878	1.612	0.193	0.17	-0.189	0.338	0.081
Thrill & adventure seeking	6.088	2.077	-0.052	0.17	-0.531	0.338	0.694
Disinhibition	6.424	1.648	0.148	0.17	-0.057	0.338	0.246

*****S=Skewness, SES=Skewness, K=Kurtosis, SEK=Kurtosis, α =Cronbach's

All latent variables are in the normal category which can be seen from the skewness (s) and kutrosis (k) values with a standard range of acceptance values from +2 to -2 and based on empirical data the positive emotional variables are still in the normal category and have good reliability with a value of (s = -1.5, k = .50, α = 76), then there is negative emotional value (s = .92, k = -.40, α = 83) then there is school burnout variable with value (s = .90, k = 1.25, α = 80) and finally there is sensation seeking with a value (s = .23, k = -0, α = 70).

Table 2. Correlation of each variable

Variable	1	2	3	4	5	6	7	8	9	10
1. Positive emotional	—									
2. Negative emotional	-0.065	—								
3. School burnout	-0.266***	0.432***	—							
4. Emotional Exhaution	-0.222**	0.358***	0.911***	—						
5. Cynism	-0.262***	0.429***	0.911***	0.66***	—					
6. Sensation seeking	0.226**	0.252***	0.121	0.089	0.131	—				
7. Experience seeking	0.202**	0.227**	0.125	0.117	0.11	0.772***	—			
8. Boredom susceptibility	0.188**	0.058	-0.069	-0.055	-0.07	0.575***	0.288***	—		
9. Thrill & adventure seeking	0.173*	0.175*	0.102	0.075	0.111	0.81***	0.492***	0.295***	—	
10. Disinhibition	0.078	0.255***	0.176*	0.107	0.214**	0.671***	0.395***	0.117	0.423***	—

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

The correlation results from the Pearson formula explain that positive emotions can provide predictions for school burnout and each variable of school burnout has a negative relationship with all variables, such as positive emotions with emotional excitement (r= -.22) and cynicism (r= -.26). Then these results also explain that negative emotion variables can provide predictions for school burnout and each variable of school burnout has a positive relationship with each variable such as emotional excitement (r = .36) and cynicism (r = .43). Furthermore, there are positive emotions that can provide predictions for sensetion seeking as a whole, but there is only one variable that is reported to have no significant relationship, such as the relationship between positive emotions and disinhibition. While positive emotions have a positive relationship with experience seeking (r= .20) boredom susceptibility (r= .18) thrill & adventure seeking (r= .17). In the last correlation there is a negative emotional relationship that can provide predictions for sensation seeking and each variable that represents sensation seeking. These results explain that there is only one variable that gives insignificant results, namely boredom susceptibility, and the rest can be predicted with negative emotions such as experience seeking (r= .22) thrill & adventure seeking (r= .17) disinhibition (r= . 25).

Discussion

The issue of student welfare has become a hot topic of discussion because every country seeks to improve the quality of their respective education, including Indonesia, which according to data on educational capabilities represented by several basic abilities is reported to be still below the average expected of a group of countries around the world (OECD , 2019) so that pressure in education, specifically pressure in the realm of cognition, is considered to be able to improve the quality of education. But on the other hand this growth in quality is followed by physical fatigue in students which is rarely seen in education because this concept is not visible directly and this phenomenon is known as school burnout so that when improving quality in education it should also be in line with mental balance which is directly affect the quality of education itself (Seijts et al., 2021).

This article confidently discusses the concept of well-being in terms of positive and negative emotions. It asserts that the higher a person's positive emotions, the lower their negative emotions. The article cites several studies that support this claim, including Andriany et al. (2021), Gundogan (2022), Jia et al. (2021), Lan et al. (2021), and Wang et al. (2020), which all found that high levels of positive emotions are associated with a lower likelihood of experiencing negative concepts, such as burnout in religious students. If an individual experiences high levels of negative emotions, there will be a corresponding decrease in positive emotions. School burnout is a well-established concept that explains physical fatigue and feelings of cynicism present in students today (Rahman, 2020). The high investment in education can potentially cause psychological disorders in students (Loscalzo & Giannini, 2020).

The previous results accept the first hypothesis where positive emotions are known to predict a negative relationship to the negatively charged school burnout variable. meaning that when students have high positive emotions, simultaneously these variables reduce school burnout felt by students. Their negative relationship is known to be not too large even though it is significant as with school burnout and all its factors (r = <.50) so this value can explain that the positive state of students has not really been able to reduce the school burnout they received while in education and not the magnitude of the relationship. This is also in line with previous research which explains that sensation seeking needs support from other variables which will mediate between sensation seeking and welfare (Kaşıkcı & Peker, 2022). In line with that, these empirical results also accept the second hypothesis where every negative emotion can predict school burnout in a positive direction where the higher the negative emotions of students, the greater the potential for the presence of school burnout in religious students and these results explain that the relationship of this variable is higher than positive emotions with school burnout. This means that the negative emotions present in students have a stronger potential to predict the presence of school burnout than the positive emotions experienced by students. Negative emotional states in students have the potential to create emotional exhaustion and cynicism with a more moderate relationship (r = ±.50) than positive emotions.

The results strongly support the third and fourth hypotheses, indicating a positive correlation between sensation seeking and both positive and negative emotions. These findings are consistent with the notion that sensation seeking is a neutral concept (Lelyana et al., 2022), capable of predicting a wide range of outcomes. It is important to note that the disinhibition variable has no significant correlation with positive emotions, and similarly, boredom susceptibility has no significant relationship with negative emotions.

This demonstrates that sensation seeking is a variable that supports both positive and negative concepts. The strong relationship between sensation seeking and negative emotions, such as higher disinhibition factors, is supported, rather than positive emotions like experience seeking and thrill & adventure seeking. The language used is clear,

objective, and value-neutral, avoiding biased or emotional language. The sentence structure is simple and the technical terms are explained when first used. The text is free from grammatical errors, spelling mistakes, and punctuation errors. No new content has been added to the text. The variable for susceptibility to boredom has a stronger relationship with positive emotions than with negative emotions. However, there is more sensation seeking associated with negative emotions than with positive emotions when considering the relationship between the two. This is supported by a significant amount of literature that highlights a strong relationship between sensation seeking and negative emotions. It should be noted that not all situations will necessarily apply the same principles.

Conclusion

This study confidently concludes that positive emotions have a negative correlation with school burnout in religious students. It is worth noting that the positive relationship is stronger than that of negative emotions with school burnout in religious students. The previously explained phenomenon of religious students experiencing negative emotions when studying at religious schools supports the idea that the presence of negative emotions can increase school burnout in all religious students at such schools. Sensation seeking is a significant predictor of both positive and negative emotions. Further research is needed to explore whether sensation seeking can mediate the relationship between other variables, such as the association between positive and negative variables. It is worth noting that previous literature has consistently shown that sensation seeking is stronger in men than in women (Nagel et al., 2019).

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report

Ethical Approval

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Exploring the Impact of SCOBA Creation on Language Learners' Reading and Reflective Thinking Skills in Concept-Based Reading Curriculum

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Abstract
A new reading curriculum incorporating the principles of concept-based instruction and reading strategy instruction was designed and implemented for a previous study. Concept-based instruction was compared with reading strategy instruction to determine the impact of the new curriculum on language learners' reading and reflective thinking skills. The data revealed that the concept-based group performed better in reflective reading and thinking skills.
The new curriculum involves the creation of a Schema of a Complete Orienting Basis of an Action (SCOBA) during reflection sessions. To explore the necessity of SCOBA creation, an experimental study with two groups was conducted, where only one group created a SCOBA. Both groups received concept-based reading instruction and were compared based on their reading, reflective reading, and reflective thinking skills. The data revealed that the groups performed similarly in reading and reflective reading skills, but the SCOBA group performed better in reflective thinking skills. The study sheds light on the importance of incorporating reflective thinking activities, such as SCOBA creation, in concept-based reading instruction.

Keywords: Reading instruction, Dialogic reading instruction, Concept-based instruction, SCOBA, Bakhtin, secondary genres, Reading multiple texts, Reflective thinking

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Introduction

Dialogic reading instruction receives much attention in first language reading research (Beck et al., 1997; Brown & Campione, 1998; Moats, 2004; Tierney & Cunningham, 1984; Wilkinson & Son, 2011; Wineburg, 1991a; Wineburg, 1991b). Exclusive focus on generic reading skills through reading strategy instruction is being abandoned, and dialogic teaching practices are encouraged (Wilkinson & Son, 2011, p. 367). In English as a Foreign Language (EFL), on the other hand, reading instruction mainly involves teaching reading strategies (Grabe, 2002; Grabe & Stoller, 2019), and dialogic teaching practices receive little attention. Therefore, there is a need to incorporate dialogic reading instruction into EFL reading instruction.

Dialogic reading instruction can be categorized into four types: content-rich instruction, discussion, argumentation, and intertextuality (Wilkinson & Son, 2011, p. 367). Content-rich instruction combines reading strategy instruction with subject-matter learning, providing a meaningful context for strategy use (Greenleaf et al., 200; Guthrie et al., 2004; Romance & Vitale, 2001). Discussion, a widely used method, involves students exchanging ideas on text content in a systematic way (Anderson et al., 1998; Beck et al., 1997; Billings & Fitzgerald, 2002; Eeds & Wells, 1989; Goldenberg, 1992/1993; Raphael & McMahon, 1994; Sharp, 1995; Short & Pierce, 1990). During discussions, students focus on aesthetic, efferent, and critical-analytic stances toward texts (Rosenblatt, 1978). Argumentation programs emphasize developing argumentation skills, with students forming and defending arguments (Michaels et al., 2008; Reznitskaya & Anderson, 2002). Intertextuality involves reading multiple texts to construct meaning and make cross-textual links, promoting critical thinking and reflection (Armstrong & Newman, 2011; Hartman, 1995; Hynd, 1999; Seixas, 1993; Wineburg, 1991a). Despite its benefits, intertextual instruction is less researched and not widely practiced among classroom teachers (Bråten et al., 2020).

To extend dialogic approaches to EFL reading instruction, I designed a new reading curriculum for EFL learners based on concept-based instruction (CBI) (Elkonin, 1999; Davydov, 1990; Davydov, 2008; Gal'perin, 1989; Gal'perin, 1992). After designing the curriculum, I conducted an experimental study comparing it with a reading curriculum exclusively focusing on reading strategies and unrelated texts (the author, 2018). The study results showed that reading strategy instruction enriched through CBI was more conducive to developing language learners' reflective reading and reflective thinking skills (the author, 2018).

The new curriculum, described and assessed in the first study (the author, 2018), had two components: (1) reading tasks and texts selected and sequenced based on a core concept relevant to reading; and (2) reflective sessions during which the students created and revised a SCOBA (Schema of a Complete Orienting Basis of an Action), which contained the students' visual representation of the core concept.

This article presents a follow-up study aiming to investigate whether the SCOBA activity can be omitted without compromising the positive outcomes in students' reading, reflective reading, and reflective thinking skills. This research focus holds significance for two main reasons.

Firstly, this study contributes to advancing concept-based reading instruction in both EFL and first language reading contexts. The possibility of omitting the creation of a SCOBA from the curriculum can make concept-based reading instruction more adaptable across diverse educational settings. The implementation of a curriculum depends on various factors such as learning outcomes, available resources (time and technology), classroom environment (class size, student engagement, and layout), and teacher expertise (beliefs, knowledge, and experience) (Graves, 2021). Some teachers may choose to focus solely on reading texts and tasks while leaving out the SCOBA element due to constraints in their teaching contexts. Additionally, teachers' beliefs about how to teach reading skills may hinder the complete application of concept-based reading instruction, as reflecting on reading-related concepts is not a common practice in traditional reading instruction.

Secondly, a literature review conducted on first- and second-language reading instruction reveals that no prior research has explored the possibility that reflecting on reading-related concepts may influence reading comprehension. Hence, this study could be pioneering research to investigate the impact of students' reflection on reading-related concepts on their reading skills.

In conclusion, concept-based reading instruction, as described in this study, represents a novel approach to EFL reading instruction. However, the specific components of concept-based instruction that contribute to the development of particular skills remain unexplored. Thus, the present study aims to investigate whether creating and revising a SCOBA on a reading-related concept enhances language learners' reading and reflective thinking skills. To address this research agenda, an experimental study with two groups was designed. Both groups were taught using the concept-based curriculum, but only one group was assigned the task of creating and revising a

SCOBA on the reading-related core concept. Students' performance in both groups will be assessed in terms of reading, reflective reading, reflective thinking, and critical reflective thinking skills before and after a 16-week instruction period.

Background

Concept-Based Reading Instruction and Curriculum

James Lantolf pioneered the extension of concept-based instruction to second language teaching (Lantolf, Xi, & Minakova, 2020). CBI has a theoretical base in Vygotsky's cultural-historical psychology and activity theory (Elkonin, 1999; Davydov, 1990; Davydov, 2008; Gal'perin, 1989; Gal'perin, 1992). Cultural-historical theory's explanations of school instruction center around the notions of scientific concepts and developmental learning (Davydov, 1990). In this section, I elaborate on these two central notions as understood in cultural-historical theory and how they guided the design of the new concept-based EFL reading curriculum.

Scientific Concepts and Developmental Learning

CBI places significant emphasis on scientific concepts. From a cultural-historical theoretical perspective, learning these scientific concepts, unlike everyday concepts, is developmental for children and young people because scientists form, elaborate, and structure them hierarchically through collective synthesis, analysis, and reflection (Vygotsky, 1987). However, merely teaching scientific concepts alone is insufficient for achieving developmental learning. Instruction should focus on the most general concept of a scientific discipline and the accompanying mode of thinking (Davydov, 1990). In other words, the curriculum and its tasks should reflect the prevalence of this most general concept and its essential features. This approach allows learners to develop a general orientation towards a discipline, enabling them to tackle numerous relevant tasks without getting lost in details (Zuckerman, 2003). Additionally, designing the curriculum and tasks based on the most general concept facilitates learning other associated sub-concepts in a relevant discipline (Davydov, 1990; Devlin, 2009; Schmittau, 2004).

Following the curriculum design principles mentioned above, I concluded that "communication through texts" could serve as the most general concept to shape the new reading curriculum, as the concept of communication has been considered essential for language teaching and curriculum design since the 1980s (Canagarajah, 2016). However, finding a scientific account of this concept that could truly make the curriculum dialogic and developmental proved challenging due to the vast literature from various disciplines such as linguistics, language acquisition, reading research, information technology, philosophy, and literature (Blackburn, 2007). After conducting a literature review on communication models and reading research, I found that Mikhail Bakhtin's dialogism was the most suitable for an EFL concept-based reading curriculum (Bakhtin, 1981; Bakhtin, 1986).

Mikhail Bakhtin, who extended the concept of dialogue to secondary genres or texts, wrote extensively about how texts are used to communicate meanings in the overall cultural system (Bakhtin, 1981; Bakhtin, 1986; Todorov, 1984; Holquist, 2002; Morson & Emerson, 1990; Fernyhough, 1996; Blackburn, 2007). Therefore, Bakhtin's work on secondary genres aligns with cultural-historical theory, which aims to balance cognitive and social factors in human psychology (Vygotsky, 1987).

Based on Bakhtin’s ideas, the texts and tasks in the new curriculum are chosen and sequenced in a way to show students that (1) texts are like rejoinders or turns in face-to-face conversations; (2) texts are tools of society to discuss important issues; (3) there are different perspectives regarding the issues discussed; (4) a writer always expects a response from the reader (confirmation or rejection of ideas and perspectives presented in the text); and (5) replicating the content of a text in our minds is passive understanding.

The new curriculum incorporates Bakhtin's idea of intertextuality. Each unit's texts either respond to each other or explore the same theme from different perspectives. Additionally, Turkish texts are included to let students explore their culture's approach to the themes. Essentially, each unit revolves around a central theme with multiple interacting texts. As students read these texts, they (1) gain a deeper understanding by accumulating information from different sources; (2) observe writers' responses and perspectives, noting contradictions, similarities, and writing style differences; (3) develop a personal perspective, either confirming or rejecting certain viewpoints; and (4) express their responses to the content and style of the texts through writing and speaking.

The classroom tasks were designed to align with Bakhtin's distinction between active and passive understanding. Two types of tasks were implemented. The first type focused on retrieving information from the text without going beyond its content. These tasks included answering questions that required specific information, identifying the main idea, summarizing key points, completing sentences, responding to true-false statements, engaging in matching exercises, and practicing vocabulary. The latter type of task involved evaluating the content and style of the texts. For instance, in the unit on divided sleep, students were prompted to answer questions such as 'Is divided sleep healthy? Would you like to practice it?' as they engaged with multiple texts on the topic. Additionally, they were asked to assess the style of the texts they read regarding divided sleep. Throughout the instruction period, these evaluation tasks were consistently given to the students.

As mentioned in the introduction, the curriculum consisted of two main components: (1) the texts and tasks selected based on Bakhtin's ideas on communication through text; and (2) the creation of a SCOBA, which is a fundamental element of concept-based instruction. The objective of this study is to investigate the potential impact of creating SCOBAs on language learners' reading, reflective reading, and reflective thinking skills. In the following section, I describe what a SCOBA is in concept-based instruction and how it was incorporated into the new curriculum. I also touch upon the connection between creating a SCOBA and reflective thinking.

SCOBAs and Reflective Thinking

The term SCOBA (Schema for a Complete Orienting Basis of an Action) was introduced to Concept-Based Instruction (CBI) by Galperin, who studied the function of the mind in our daily activities and the transformation of material actions into ideal and mental actions (Arievitch, 2003; Wertsch, 2000; Haenen, 1996). Galperin argued that the mind's main role was to plan and regulate a person's future mental and material actions, particularly in situations involving non-standardized tasks. He introduced the concepts of orienting activity and orienting the basis of an action (OBA). According to his theory, all human activity consists of two parts: the orienting part and the execution part. The orienting part precedes the actual task performance (execution). During the orienting part, we first create a mental image of the desired outcome of the activity. Additionally, during the orientation activity, we mentally assess and test the results of both mental and material actions available to us. These mentally created representations, known as OBAs, enable us to evaluate the execution phase. We can determine whether our imagined outcome is being achieved at a desirable level or whether new tools and skills are required to attain the imagined or ideal outcome.

The content of OBAs is influenced by relevant past experiences (Engeness, 2020). Thus, the richness and completeness of our OBAs depend on the relevance of our prior experiences. Individuals with richer and more complete OBAs tend to excel in selecting suitable actions, anticipating and evaluating outcomes, and achieving their envisioned goals. In education, Galperin extended this concept to suggest that high-quality OBAs provided to students can enhance their performance in learning tasks and improve their understanding of school concepts (Engeness, 2020). Galperin used the term Scheme of Complete Orienting Basis of an Action (SCOBA) to describe high-quality OBAs designed by teachers for educational purposes (Gal'perin, 1992). In other words, OBAs represent learners' initial orienting bases, while SCOBA refers to the orienting basis teachers aim to instill in students during their learning tasks. A SCOBA should contain the following elements (Haenen, 1996, p. 135):

(1) the intended output of an action;
(2) the pattern or model of the action as executed by an 'expert';
(3) the means of the action;
(4) the objects of the action;
(5) a general plan of action, an 'action-algorithm' or 'operational thinking scheme' giving the course of the action and the sequence of its operations in a summarised form;
(6) the orienting chart or 'cheat-sheet' representing the previous five components in such a way that it serves as a 'tool of action.'

Learners can appropriate a SCOBA in two main ways: by receiving a ready-made SCOBA from the teacher or by being guided to create their own SCOBA. For the new curriculum, I opted for the guided SCOBA method (see Haenen, 1996 for the first type). The content of the SCOBA in the new curriculum was implicit in the selection of texts and classroom tasks, following Bakhtin's dialogism. The SCOBA's elements in the new curriculum included: (1) Intended Output: Learners were expected to provide oral or written personal responses to the texts' content and the writers' style. (2) Model of the Reading Action: Learners engaged in active and dialogic understanding, following Bakhtin's distinction. (3) Means of Action: Learners read multiple texts with various perspectives on a theme. (4) Object of the Action: Learners interpreted and responded to a text by incorporating content from other related texts and their personal experiences. (5) Orienting Chart: The SCOBAs were created by learners in four reflection sessions (see Appendix A for the SCOBAs created by the students).

Galperin emphasized the importance of a good SCOBA being schematic and visual to promote active and reflective learning of scientific concepts (Zuckerman, 2003). During the initial stages of instruction, teachers should avoid providing students with overly precise or ready-made wording, as this can lead to mere memorization and speech stereotypes unrelated to actual learning objectives (Galperin, as cited in Engeness 2020, p. 41). To prevent such memorization, a SCOBA should visually represent the concept and its associated mental and material actions. This visual representation encourages students to use their own words, making their mental actions visible to both teachers and themselves. Consequently, students can better evaluate the correspondence between their imagined and actual outcomes, as well as the effectiveness of their mental strategies in achieving the desired outcome.

During the implementation of the new curriculum, students participated in four reflection sessions, each lasting three 45-minute class periods and occurring once a month. The first session began on the first day of instruction, where students were assigned to groups of four and tasked with visually mapping their reading experiences by answering questions like, 'How do you think communication happens through texts? Can you describe your ideas visually on a piece of paper?'. One student from each group presented the group's drawing to the class, and a new visual representation was collaboratively created. In the following three reflective sessions, held monthly, students revised their previous drawings. These diagrams or schemes served as memory aids during discussions and helped track learners' conceptual development.

The SCOBA activity did not involve direct imitation; instead, it required reviewing past reading experiences and abstracting essential characteristics of texts and communication. It also involved forming and revising hypotheses about the curriculum's core concept, aligning with Bakhtin's ideas. This inherent nature of the SCOBA activity suggests that including SCOBA in a concept-based reading curriculum could enhance learners' reflective thinking. Reflective thinking involves “a careful re-examination and evaluation of experiences, beliefs, and knowledge, leading to new perspectives” (Kember & McKay et al., 2008, p. 370). Therefore, the study assessed reflective thinking to examine the effects of SCOBA creation on learners' reading and reflective thinking abilities.

Conceptual Focus in Reading Instruction and Curriculum

Conceptual focus is unavoidable in reading instruction because texts, whether fiction or non-fiction, always revolve around one or more concepts. However, the idea of a conceptual focus in reading instruction pertains to how curriculum and material designers utilize concepts to choose and organize texts and tasks within a reading program. This section explores different approaches to incorporating concepts in both first and second language reading curricula and material design.

The first approach involves teaching subject-matter concepts, with texts grouped based on core and associated sub-concepts. Examples include Concept-Oriented Reading Instruction (CORI) (Guthrie et al., 2004), In-Depth Expanded Application of Science (IDEAS) (Romance & Vitale, 2001), and Reading Apprenticeship (Greenleaf et al., 2001). In second language education, Content and Language Integrated Learning (CLIL) programs also adopt this approach. In CLIL, language learners read texts to learn the language and subject matter concepts (DeBoer & Leontjev, 2020). These programs generally do not present alternative views on the concepts within the texts and avoid inconsistencies across texts.

The second approach treats concepts in texts critically, encouraging students to question how worldviews or beliefs shape these concepts. Several first language programs follow this approach, such as Collaborative Reasoning (Anderson et al., 1998), Paideia Seminars (Billings & Fitzgerald, 2002), and Philosophy for Children (Sharp, 1995). In these programs, students and teachers have interpretive authority and use extratextual knowledge to question concepts in texts. Learners rely on personal experiences to approach concepts critically within a single text, without using other texts for different perspectives. Concepts are not generally presented through multiple texts containing contradictory perspectives.

The third approach involves focusing on a single or limited number of concepts across a series of texts to ease students' cognitive burden during the reading process. Research on reading emphasizes the strategic use of prior knowledge, making it critical for successful comprehension (Renandya, Krashen, & Jacobs, 2018; Schmitt & Carter, 2000). Assigning a series of texts on the same topic helps students read fluently and confidently, as they don't need to construct new background knowledge for each text. An example of this approach is narrow reading, commonly used in second language teaching, where learners read multiple texts from the same author or on the same topic over an extended period of time (Chang & Millet, 2017). This approach ensures vocabulary recycling, aiding students' vocabulary acquisition through repeated exposure (Chang, 2019; Renandya, Krashen, & Jacobs,

2018; Kang, 2015; Schmitt & Carter, 2000). However, narrow reading primarily occurs outside of class time, requiring minimal classroom instruction.

The new curriculum adopts a dual conceptual focus that is hierarchically related. The lower focus centers on concepts presented in the texts. Throughout the instruction period, students engage with multiple texts organized around specific concepts or issues, enabling them to delve deeply into these concepts by exploring various perspectives. On the other hand, the higher focus revolves around texts and written communication itself. This aspect was integrated into the curriculum through the text and task selection and creation of a SCOBA over four reflection sessions (described earlier). The overarching goal was to instill in students a general communicative orientation and conceptualization, as defined by Bakhtin, regarding texts, reading tasks, and the communication process facilitated by texts.

The way language learners conceptualize texts and written communication can significantly impact their text comprehension and reading improvement efforts (Conradi, Jang, & McKenna, 2014). Factors such as the type of reading instruction, out-of-school reading experiences, and socioeconomic status influence students' conceptualizations (Heath, 1983; Heath, 1991; Lepola and Lynch et al., 2016). Some learners view texts as mere documents to decode, focusing solely on learning vocabulary and grammar rather than engaging with higher-level reading skills. Consequently, they may overlook the importance of drawing upon prior knowledge from other texts and personal experiences to comprehend new material. While integrating personal experiences and information from other texts may come naturally with easier material, it becomes challenging with difficult passages, leading to comprehension difficulties and a loss of motivation.

The way language learners conceptualize texts and written communication can be attributed to their teachers' instructional practices and the reading materials used in class. When teachers primarily use texts as a context for teaching grammar and vocabulary while neglecting tasks and materials that promote higher-level reading skills, learners' conceptualizations may remain at a lower level. Additionally, using authorless texts most of the time can hinder students from paying attention to authors' perspectives and styles when reading. These examples illustrate how teaching practices and specific aspects of a reading curriculum can shape learners' conceptualizations, ultimately influencing their reading habits and strategies.

The new reading curriculum aimed to replace students' everyday conceptualizations of texts and written communication with a dialogic perspective. Three curriculum design strategies were employed to achieve this goal. Firstly, the curriculum included texts written in response to each other, exposing students to the elaboration of concepts through social-level communication. The second strategy involved selecting tasks that required students to express their views on the main concept of each module, assess the writers' styles, and provide reasons for their preferences. The third strategy involved creating a series of SCOBAs and visually recording students' conceptualizations of texts and written communication. These three elements in the new curriculum prioritize the concept of written communication.

Methodology

The study has a pre- and post-test quasi-experimental design with two groups. Both groups received concept-based instruction, but only the experimental group created a SCOBA in four reflection sessions. Therefore, in the article, the experimental group's instruction is called Concept-Based Instruction with a SCOBA (CBI with SCOBA), and the control group's instruction is called Concept-Based Instruction without a SCOBA (CBI without SCOBA).

Research Questions

RQ1: Does creating a SCOBA improve students' reading skills?
RQ2: Does creating a SCOBA improve students' reflective reading skills?
RQ3: Does creating a SCOBA improve students' reflective thinking skills?
RQ4: Does creating a SCOBA improve students' critical reflective thinking skills?

The Setting and The Participants

The study was conducted at a preparatory EFL program at a state university in Türkiye. The students attended English classes for five hours a day over an eight-month period before starting their regular faculties. Reading instruction was allocated eight hours per week. The students started the program as elementary-level language learners and progressed to become upper-intermediate language learners by the end. Turkish was the mother

tongue for most students. Two classes were randomly selected and assigned as the experimental and control groups. The researcher taught both groups. Table 1 displays the distribution of the participants.

Table 1. The Participants in the Study

Gender	Experimental group	Control group	Total
Male	20	17	37
Female	7	8	15
Total	27	25	52

Data Collection and Analysis

The study utilized three instruments as pre- and post-tests for both groups. The first instrument consisted of two subscales from the Reflection Questionnaire (RQ) developed by Kember and his associates (Kember et al., 2000). The RQ assesses two levels of reflective thinking: reflection and critical reflection. Reflection involves a careful re-examination and evaluation of experience, beliefs, and knowledge, leading to new perspectives. On the other hand, critical reflection is the highest level, necessitating a transformation of deep-seated beliefs and leading to new belief structures (Kember & McKay et al., p. 370). The Cronbach Alpha coefficients for the subscales ranged between .62 and .76. The RQ consists of eight items rated on a 5-point Likert scale, ranging from 5 (Definitely Agree) to 1 (Definitely Disagree). The validity and reliability of the Turkish version of the RQ were investigated by Başol and Gencel (2013), and it was completed by the students in the study.

The second and third instruments assessed the participants' reading comprehension. These instruments were designed by the researcher based on the PISA 2015 Assessment and Analytical Framework, which describes critical reading skills for the 21st century (OECD, 2016, p. 54). The framework includes sample test items to evaluate specific reading skills and comprehension of multiple texts, which is crucial for the study.

Figure 1. Aspects of Reading in the PISA 2015 Assessment and Analytical Framework (OECD, 2016, p. 54)

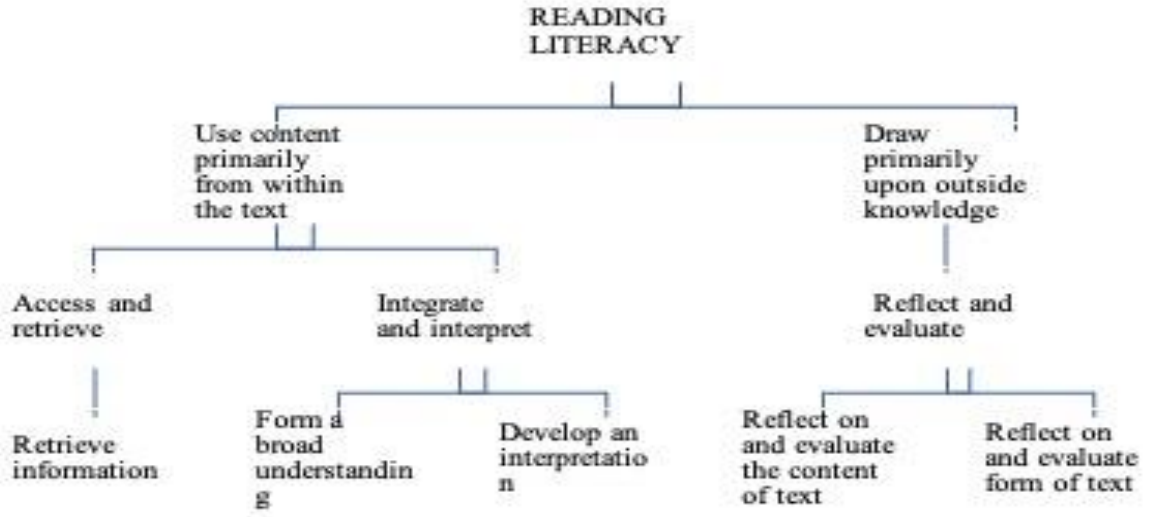

Figure 2. Aspects of Reading in the PISA 2015 Assessment and Analytical Framework (OECD, 2016, p. 54)

According to the framework, reading comprehension skills are categorized into two main types: those involving direct information from texts and those requiring knowledge beyond the texts. The first category served as the basis for designing the reading assessment instrument named Tasks for the Assessment of Target Reading Skills (TATRS). This instrument consisted of three reading texts and 20 items that could be answered using information solely from the texts. It aimed to evaluate students' performance in three aspects of reading comprehension: (a) retrieving information, (b) forming a broad understanding, and (c) developing an interpretation. The reliability of the TATRS was assessed in a prior study involving 117 preparatory English students from another state university in the same city (The Author, 2018). The Cronbach Alpha value of .82 indicated a desirable level of reliability for the TATRS.

The second reading assessment instrument, named Tasks for the Assessment of Reflective Reading Skills (TARRS), focused on evaluating the reading skills falling under the second category of the PISA 2015 Assessment and Analytical Framework (OECD, 2016). The same reading texts were used in this instrument, but the tasks required students to utilize information from multiple texts or beyond the texts. The TARRS consisted of four open-ended items, which prompted students to evaluate (a) the content and (b) the form of the texts included in the instrument. A scoring rubric was developed, with points ranging from 0 to 2 (0: missing, 1: partial score, 2: full score). The researcher scored the students' responses.

To assess the inter-rater reliability of the scores, the researcher and another English teacher independently scored all the students' responses in the post-test. The interrater reliability of the scores was calculated using Kendall's tau c on SPSS (Rovai, Baker & Ponton, 2014). The results indicated a consistent and satisfactory level of agreement between the scores given by the researcher and the other English teacher for all items.

Table 2. Interrater Reliability Statistics for the Open-ended Questions in TARSS

Question	Kendall's tau c	Significance
Q.9	.818	.000
Q.10	.756	.000
Q.17	.710	.000
Q.24	.753	.000

Data Analysis and Findings

The study aimed to determine whether creating a SCOBA would lead to a significant increase in the mean scores of the participants in the experimental group (CBI with a SCOBA) compared to the control group (CBI without a SCOBA). A total of 52 participants were recruited, with 27 in the experimental group and 25 in the control group. A one-way repeated ANCOVA analysis was conducted to test the hypothesis of a significant difference in the mean scores of four dependent variables (Reading Score, Reflective Reading Score, Reflection Score, Critical Reflection Score) between the pre-test and post-test measures.

The analysis also controlled for baseline test performance on each variable as a covariate. Including pre-test scores as a covariate helps control for individual differences in baseline performance and pre-group differences on the dependent variables, which could impact the interpretation of results. By doing so, any differences in pre-test scores among the participants can be statistically adjusted for, increasing the power of the analysis to detect the effects of the intervention on the dependent variable. Using pre-test scores as a covariate allows for a more precise estimate of the intervention effect by removing the potential confounding effects of individual differences in pre-test scores (Schneider et al., 2015).

The assumptions of the one-way repeated ANCOVA test were met in this study (see Appendix B for the test results). Table 3 displays the results of the ANCOVA tests.

Table 3. Analysis of Covariance (ANCOVA) Results for the Effect of an Intervention on Reading Scores and Reflection Measures by Group of Experiment versus Control.

	Source	Type III SS	df	Mean Square	F Value	P Value	Effect Size
Reading score	Model	1164.68	2	582.34	46.7	< .001	$\eta^2 = 0.65$
	Group	2.35	1	2.35	0.47	0.497	$\eta^2 = 0.01$
	Error	1016.32	49	20.74			
Reflective reading	Model	32.6	2	16.3	10.22	< .001	$\eta^2 = 0.39$
	Group	0.06	1	0.06	4.61	0.039	$\eta^2 = 0.01$
	Pre-reflective reading score	18.48	1	18.48	14.58	< .001	$\eta^2 = 0.23$
	Error	49.92	49	1.02			
Reflection	Model	147.63	2	73.81	7.53	0.001	$\eta^2 = 0.23$
	Group	25.23	1	25.23	8.09	0.006	$\eta^2 = 0.12$
	Pre-reflection score	22.62	1	22.62	9.62	0.003	$\eta^2 = 0.14$
	Error	347.64	49	7.1			
Critical reflection	Model	1866.15	2	933.07	67.51	< .001	$\eta^2 = 0.73$
	Group	96.17	1	96.17	25.09	< .001	$\eta^2 = 0.13$
	Pre-RQ critical reflection score	2321.02	1	2321.02	114.84	< .001	$\eta^2 = 0.61$
	Error	648.87	49	13.24			

Note: This table presents the ANCOVA results for the effect of an intervention on post-reading scores, reflective

reading scores, reflection scores, and critical reflection scores, compared between experimental and control groups. The table displays the sources of variation, degrees of freedom, mean squares, F-values, and partial eta-squared values for each variable. df = degrees of freedom; SS = sum of squares; η^2 = partial eta squared.

Reading Skills

Based on the ANCOVA results, there was no statistically significant difference in post-reading scores between the experimental and control groups ($F(1,49) = 0.47$, $p = 0.497$). This suggests that the CBI with SCOBA did not have a significant effect on improving post-reading scores for the experimental group compared to the control group. However, it is important to note that the overall effect of the intervention on the post-reading score was significant ($F(2,49) = 46.70$, $p < .001$, $\eta^2 = 0.65$), which could be attributed to factors such as the presence of the same reading tasks in both instructional conditions, the participants' prereading scores, and other non-intervention-related factors. This result suggests that the CBI with SCOBA did not improve reading skills better than the CBI without SCOBA at a statistically significant level.

Reflective Reading Skills

The results of the ANCOVA indicate that there was a significant overall effect of the pre-reflective reading score on the post-reflective reading score ($F(2,49) = 10.22$ $p < .001$, $\eta^2 = 0.39$), as well as a significant effect of the grouping variable (experimental vs. control) on the post-reflective reading score ($F(1,49) = 4.61$ $p = .039$, $\eta^2 = 0.01$). The overall model was significant, with a large effect size ($\eta^2 = 0.39$), indicating that the pre-reflective reading score explains a substantial amount of the variance in the post-reflective reading score. However, the effect of the grouping variable on the post-reflective reading score was not significant, with a small effect size ($\eta^2 = 0.01$). These findings suggest that while the pre-reflective reading score is a strong predictor of the post-reflective reading score, there was no significant difference in the improvement of reflective reading scores between the experimental and control groups. This suggests CBI with SCOBA was not better at improving reflective reading skills than CBI without SCOBA at a statistically significant level.

Reflective Thinking

The results of the ANCOVA indicate a significant overall effect of the pre-reflection score on the post-reflection score and a significant effect of the grouping variable (experimental vs. control) on the post-reflection score. The overall model was significant ($F(2,49) = 7.53$, $p = 0.001$), indicating that the pre-reflection score and the grouping variable together explain a significant proportion of the variance in the post-reflection score. The effect of the grouping variable on the post-reflection score was significant ($F(1,49) = 8.09$, $p = 0.006$), with a medium effect size ($\eta^2 = 0.12$). This suggests the experimental group had a significantly higher post-reflection score than the control group. Additionally, the effect of the pre-reflection score on the post-reflection score was significant ($F(1,49) = 9.62$, $p = 0.003$), with a medium effect size ($\eta^2 = 0.14$). This suggests that the pre-reflection score is a significant predictor of the post-reflection score. Overall, these findings indicate that CBI with SCOBA had a significant impact on the post-reflection score and that the pre-reflection score is an important predictor of the post-reflection score.

There was a statistically significant mean difference in post-test scores between the experimental and control groups (mean difference = 1.63, SE = 0.57, $t(49) = 2.85$, $p < 0.01$, Bonferroni corrected), with a large effect size (Cohen's $d = 0.80$). This result indicates that the CBI with SCOBA was better at improving reflective thinking skills than the CBI without SCOBA at a statistically significant level.

Critical Reflective Thinking

The results of the ANCOVA indicate that there was a significant overall effect of the pre-critical reflection score on the post-critical reflection score, as well as a significant effect of the grouping variable (experimental vs. control) on the post-critical reflection score. The overall model was highly significant ($F(2,49) = 67.51$, $p < .001$), indicating that the pre-critical reflection score and the grouping variable together explain a large proportion of the variance in the post-critical reflection score. The effect of the grouping variable on the post-critical reflection score was significant ($F(1,49) = 25.09$, $p < .001$), with a small effect size ($\eta^2 = 0.13$). This suggests that the SCOBA group had a significantly higher post-critical reflection score than the group without SCOBA. Additionally, the effect of the pre-critical reflection score on the post-critical reflection score was significant ($F(1,49) = 114.84$, $p < .001$), with a large effect size ($\eta^2 = 0.61$). This suggests that the pre-critical reflection score is a very strong predictor of the post-critical reflection score. Overall, these findings indicate that the CBI with SCOBA had a

significant impact on the post-critical reflection score and that the pre-critical reflection score is an extremely important predictor of the post-RQ critical reflection score.

There was a statistically significant mean difference in post-test scores between the experimental and control groups (mean difference = 2.56, SE = 0.51, $t(49) = 5.01$, $p < 0.001$, Bonferroni corrected), with a large effect size (Cohen's d = 1.39). This result indicates that CBI with SCOBA improved critical reflective thinking skills better than CBI without SCOBA at a statistically significant level.

To sum up, the effect sizes for the grouping variable were moderate for reflective reading ($\eta^2 = 0.01$) and reflection ($\eta^2 = 0.12$) and small for critical reflection ($\eta^2 = 0.13$), indicating a modest but statistically significant effect of the CBI with SCOBA on the experimental group's scores. Additionally, the large effect size ($\eta^2 = 0.39$) for the pre-reflective reading score on the post-reflective reading score suggests that the pre-reflective reading score was a strong predictor of the post-reflective reading score, and the large effect size ($\eta^2 = 0.61$) for the pre-critical reflection score on the post-critical reflection score suggests that the pre-critical reflection score was an extremely important predictor of the post-critical reflection score. Therefore, the CBI with SCOBA significantly improved learners' reflective and critical reflective thinking skills, and the pre-intervention scores for reflective reading and critical reflection were important predictors of post-intervention scores. Overall, these findings suggest that the CBI with SCOBA may be a promising approach to enhancing learners' reflective thinking and critical reflective thinking skills.

Discussion and Implications

The data analysis presented earlier indicates that the CBI group with a SCOBA and the CBI group without a SCOBA performed similarly in terms of reading and reflective reading skills. Therefore, including a SCOBA activity in a concept-based reading curriculum may not significantly impact the positive results related to these skills. This result can be attributed to the presence of the same reading texts and tasks in both instruction conditions. Consequently, if a reading teacher's main goal is to improve students' basic reading and reflective reading skills, concept-based reading instruction without a SCOBA could be a feasible option. This finding is especially relevant because classroom time is limited, and language teachers must consider various factors when planning their instruction. In the current study, the students received 25 hours of EFL instruction per week, with eight hours allocated to reading instruction. This allowed for the implementation of a fully-fledged concept-based instruction. However, in EFL programs with fewer teaching hours, focusing on higher-order thinking skills like reflection and critical reflection may not be practical until learners have improved their basic reading and vocabulary skills. In such cases, teachers may still incorporate some aspects of conceptualizations of written communication within the constraints of the curriculum. For instance, teachers could occasionally discuss how texts are used in the overall cultural system, drawing parallels between face-to-face conversation and written communication. They may also encourage students to talk about how they deal with texts containing contradictory information in their daily lives. Simple tasks could be assigned to enhance students' conceptualizations of written communication, such as discussing whether they have read other texts on the same topic and how these texts relate to or differ from the reading text. Additionally, teachers may assign connected texts as homework instead of random texts to foster a more sophisticated understanding of concepts.

As noted earlier in the findings section, while both groups performed similarly in reading and reflective reading skills, the SCOBA group appeared to develop more in reflective thinking skills. This finding suggests that getting students to create a SCOBA can efficiently foster reflective thinking skills in reading classes. Developing reflective thinking skills in reading classes may not be as straightforward as it may seem. First, reflective thinking, a higher-order cognitive skill that'requires the subject of a thought process to become its object' (OECD, 2005: 8–9), does not develop most of the time without well-planned educational interventions. Secondly, reflection involves overarching metacognitive skills used and practiced across all scientific fields and domains of life. Therefore, its content varies depending on the scientific discipline, the life context in which it is practiced, and the educational context in which it is taught. Because of these inherent characteristics of reflective thinking, a relevant and interesting question is: what should be the content of students' reflections, or what should students reflect on in a reading program? Since no study specifically addresses this question in the context of reading instruction, it may be helpful to look at studies reporting interventions to improve reflective thinking in other contexts. Based on these studies, the content of reflective thinking can be 'beliefs', 'experiences', 'knowledge', 'actions','situations', 'ideas', and 'emotions' (Nguyen & Fernandez et al., 2014).

Looking at these potential content types, we can see that there are three main categories: cognitive content (e.g., knowledge, concepts, ideas), non-cognitive content (e.g., actions, experience), and affective content (feelings, attitudes) (Nguyen & Fernandez et al., 2014). Considering the first category in the context of reading instruction,

there are two possible options. The first option involves reflecting on concepts or ideas found in texts. In reading programs within this approach, students reflect on the ideas and concepts in texts. A relatively more careful and systematic intervention can involve learning deeply about a particular concept and then thinking about how to relate it to one's experiences to change actions or conceptualizations. In this more systematic intervention, presenting students with multiple texts organized around a theme or idea may be more effective. The second option can involve reflecting on concepts related to texts and written communication. In reading programs with this approach, students might reflect on text and written communication concepts, such as intertextuality, discourse community, genre, and literary devices. In simplistic terms, students reflect on how texts are used to communicate ideas and meanings, the nature of texts, interactions between texts, texts' impact on individuals (both the reader and the writer), and society. Reflecting on such concepts can help learners understand how authors convey meaning and develop the text's theme. This type of reflection can change students' reading habits and attitudes toward texts and written communication.

When we consider the second category (non-cognitive content such as actions and past experiences), the content of reflection in reading instruction can be students' reading experiences in and beyond the classroom. In this case, students reflect on how they read texts and their strategies to find better ways to complete tasks requiring reading skills. A relatively more systematic intervention can encourage students to reflect on their reading experiences in the context of social-level processes. For example, students can consider how communities of practice, which are groups of individuals who share a common interest or profession and regularly interact to develop shared knowledge and skills, bring their collective understanding and perspectives to the interpretation of texts (Seixas, 1993). This can help students develop a deeper understanding of how reading is influenced by social context and shared practices.

In the third category, the content of reflection is students' affective responses to texts and their content. In this case, reflection involves thinking about the emotions that arise in response to opinions, characters, and events in texts. This can help students connect with the texts more deeply and make meaning of their reading experiences. This content type may be suitable for reading programs that contain mostly literary texts (Rainey, 2017).

Given the background presented above, the new curriculum implemented both cognitive and experiential content approaches to reflective thinking in reading instruction. The students in the study reflected on how communication happens through texts and expressed their answers and ideas using visual representations such as schemes, pictures, or diagrams, known as SCOBAs. These SCOBAs served as memory tools to help students retain their reflections and also served as assessment tools for teachers to track students' conceptual changes. The results of the study demonstrated that the students who created SCOBAs exhibited greater improvement in their reflective thinking skills compared to those who did not create SCOBAs, despite both groups reading the same texts and completing the same reading tasks. This finding indicates that incorporating SCOBAs can effectively enhance students' reflective thinking in reading instruction. Reading teachers seeking to develop their students' reflective thinking can encourage them to reflect on reading-related concepts and employ SCOBAs to track their reflection process. Additionally, the curriculum used in this study provides teachers with valuable guidance on systematically and consistently incorporating reflective thinking skills into the reading curriculum through the use of SCOBAs.

However, reflecting on reading-related concepts in reading instruction to improve reflective thinking is not a common teaching practice. To address this gap in the literature, the present study offers preliminary data on the potential benefits of integrating reading-related concepts for developing reflective thinking skills in first- and second-language reading classes. Moreover, the study suggests that the creation of SCOBAs can serve as an effective teaching strategy when language-related concepts need to be reflected upon as part of a reading curriculum.

For teachers who do not wish to focus on reading-related concepts, an alternative approach is to encourage students to reflect on the concepts found within texts using concept mapping. One popular method is the "Novakian" approach, named after its originator, Joseph Novak (Novak & Gowin, 1984). This technique involves creating a hierarchical structure of concepts, with more general concepts at the top and more specific ones at the bottom. Connections between concepts are represented by lines or arrows, depicting the relationships between them. In the context of reading instruction, Novakian concept mapping can assist learners in organizing and structuring their knowledge, facilitating better understanding and retention of information, and promoting reflective thinking skills (Novak, 1990). Additionally, teachers can get students to create hierarchical concept maps in small groups and later share them with the entire class. This collaborative approach encourages interaction among learners and can support the development of reflective thinking skills. When students explain their concept maps and thought

processes to their peers, they gain better insight into their own understanding, leading to potential revisions of their concept maps compared to working individually. Finally, I recommend that teachers and material designers provide students with multiple texts grouped around a concept. Rather than using the Novakian method to represent the content of a single text, it would be more beneficial to ask students to create a visual representation of a group of texts clustered around the same topic. By doing so, students can continuously revise their concept maps as they encounter new information from each text, leading to further development of their reflective thinking skills.

Classroom procedures to develop reflective thinking skills are essential in reading instruction. The abundance of information we encounter every day may lead us to focus on information management rather than seeking reliable sources (Alexander, 2020). Many students, influenced by digital content, prefer consuming shorter texts like tweets and memes and find longer texts, such as book chapters and scientific articles, boring and challenging (Twenge, Martin, & Spitzberg, 2019). Another challenge is the presence of digital sources lacking credibility and expertise (Wineburg & McGrew, 2019), along with purposefully deceptive and misleading content. This makes information seeking risky, particularly for young students (Sinatra & Lombardi, 2020). Research indicates that students often rely on search engines for text choices and struggle to differentiate credible from unreliable sources (Bråten et al., 2011; List & Alexander, 2017). Furthermore, students may unconsciously or consciously select sources that align with their pre-existing beliefs rather than critically evaluating sources (List, Grossnickle, & Alexander, 2016). This behavior, along with a tendency to address contentious issues in a black-and-white manner (Bråten et al., 2011), hinders students from forming balanced arguments. These challenges demand urgent attention in reading classes, materials, and curriculums (Alexander, 2020). In the 21st century, readers require higher-order reading skills beyond basic comprehension, and these skills must be explicitly taught in schools.

Focusing explicitly on communication through texts seems like a promising instructional approach to help first- and second-language readers overcome the daily reading challenges they encounter. Such a focus can raise students' awareness of how texts are used for communication and meaning-making in society and encourage them to read more about contentious issues before forming their perspectives. An explicit focus on the concept of 'communication through texts' in reading instruction also aligns with pedagogical experts' arguments that schools should teach the four C's: communication, critical thinking, collaboration, and creativity (Trilling, 2009; Kivunja, 2015; Davidson, 2017).

Conclusion

Two broad conclusions could be drawn from the findings of the current study. The first is that getting students to create SCOBAs can be omitted in concept-based reading instruction without lessening the positive results in improving students' basic reading and reflective reading skills. Second, getting students to create SCOBAs could be a viable classroom teaching strategy to develop students' reflective thinking skills in reading instruction.

The study's findings are interesting, but there are several limitations that open up lines of inquiry for future research. First, the study did not involve many participants. It, therefore, remains to be seen whether and to what extent the findings reported here may transfer to classrooms in other contexts. Second, the study provided no data on students' views on concept-based reading instruction. Future research is needed to determine what aspects of CBI are considered favorable or unfavorable by students. Third, applying concept-based reading instruction falls on the shoulders of teachers and material writers, and the present study did not provide any data on their views. Future research is needed to determine possible drawbacks and challenges in applying concept-based reading instruction from the perspective of teachers and material writers. Fourth, the new curriculum was implemented, with EFL students receiving eight hours of reading instruction weekly. Many EFL learners, on the other hand, do not have that much classroom time dedicated to reading instruction. Future research is needed to investigate how concept-based reading instruction can be implemented with EFL students who have two hours of instruction in EFL skills. A final future line of inquiry involves finding other potential reading-related sub-concepts to enrich the reading curriculum described in the study.

Ethical Approval

Ethical permission (56– 11.07.2023) was obtained from Ethics Committee of Selçuk University Faculty of Education for this research.

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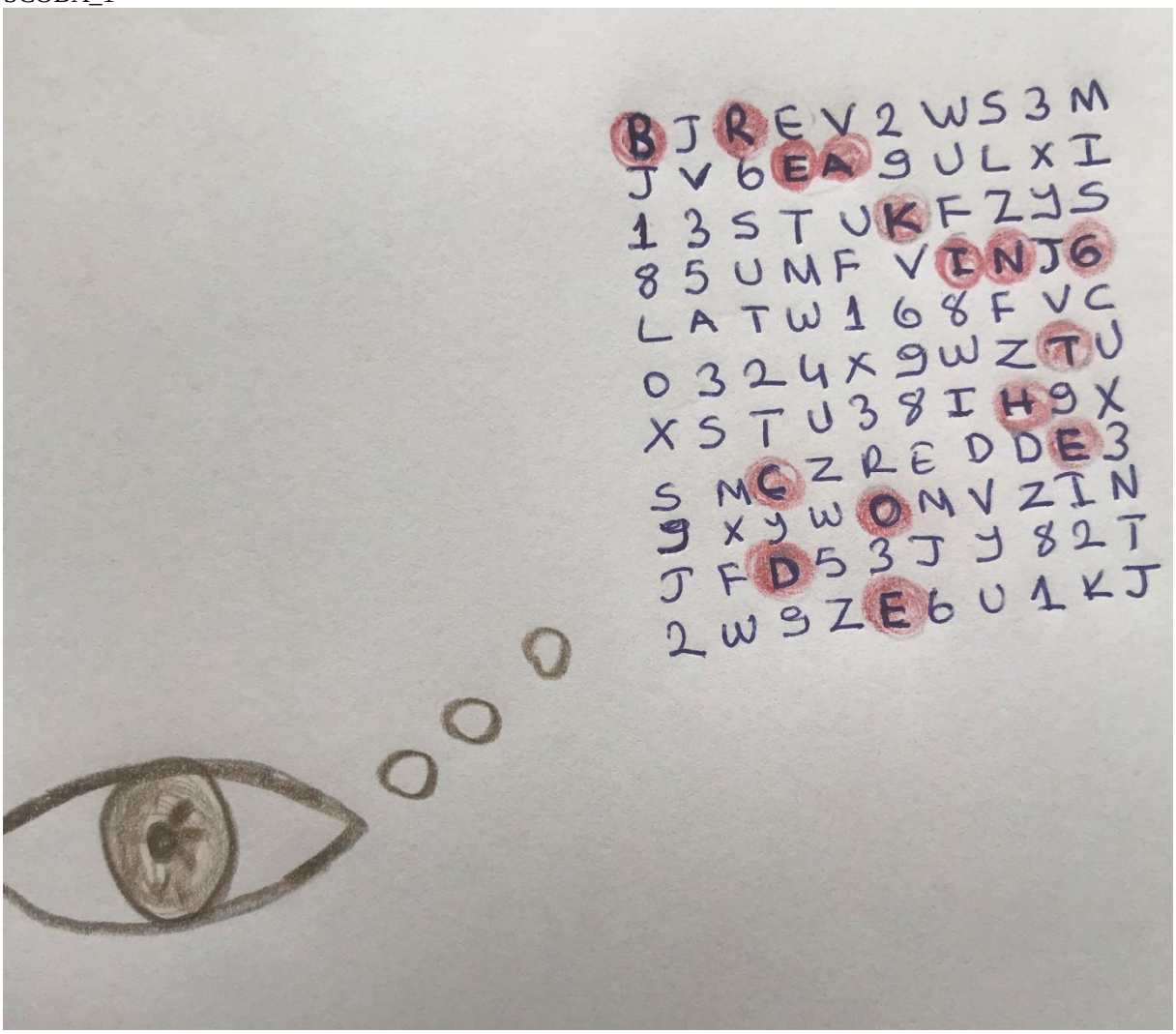
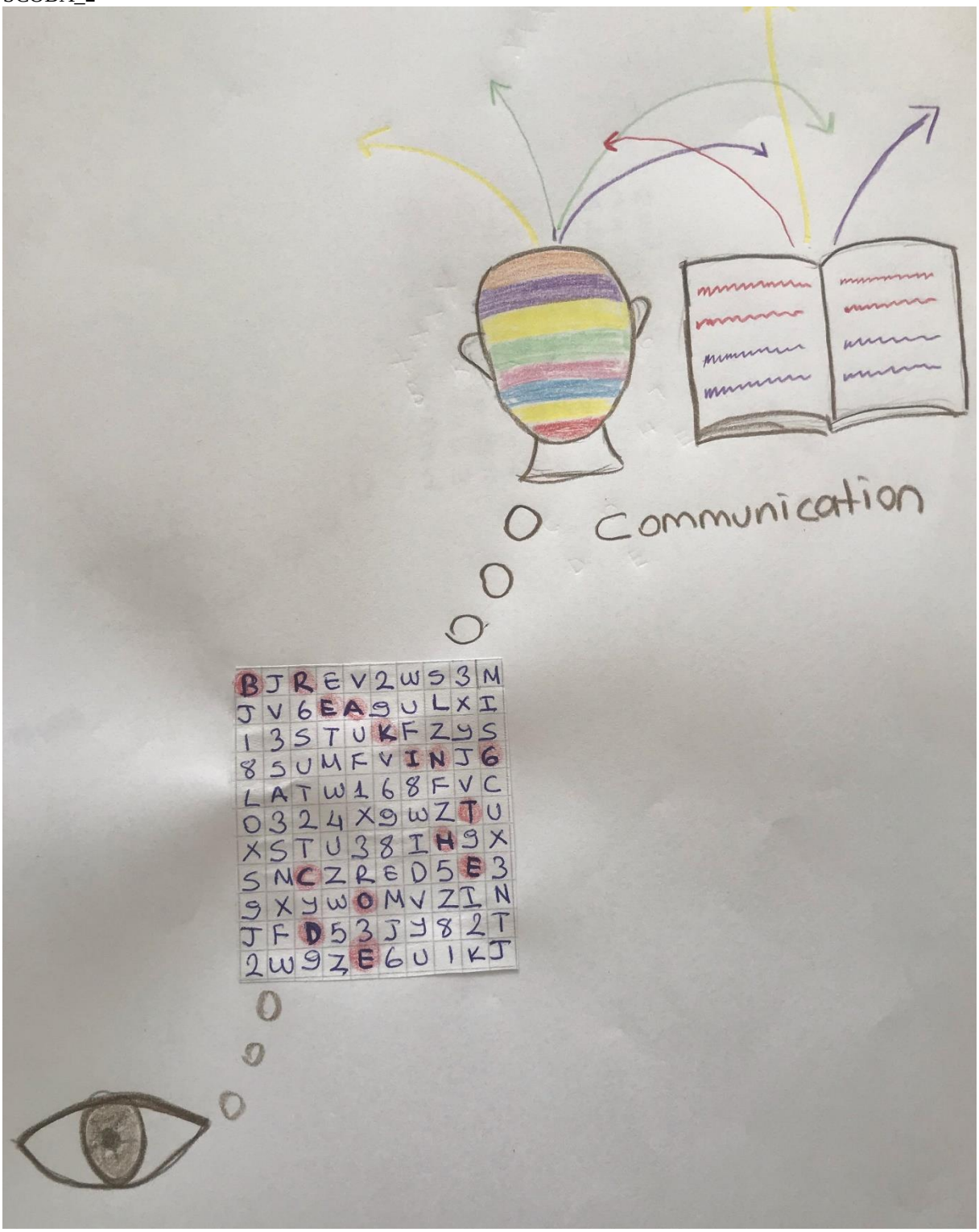
APPENDICES

APPENDIX A

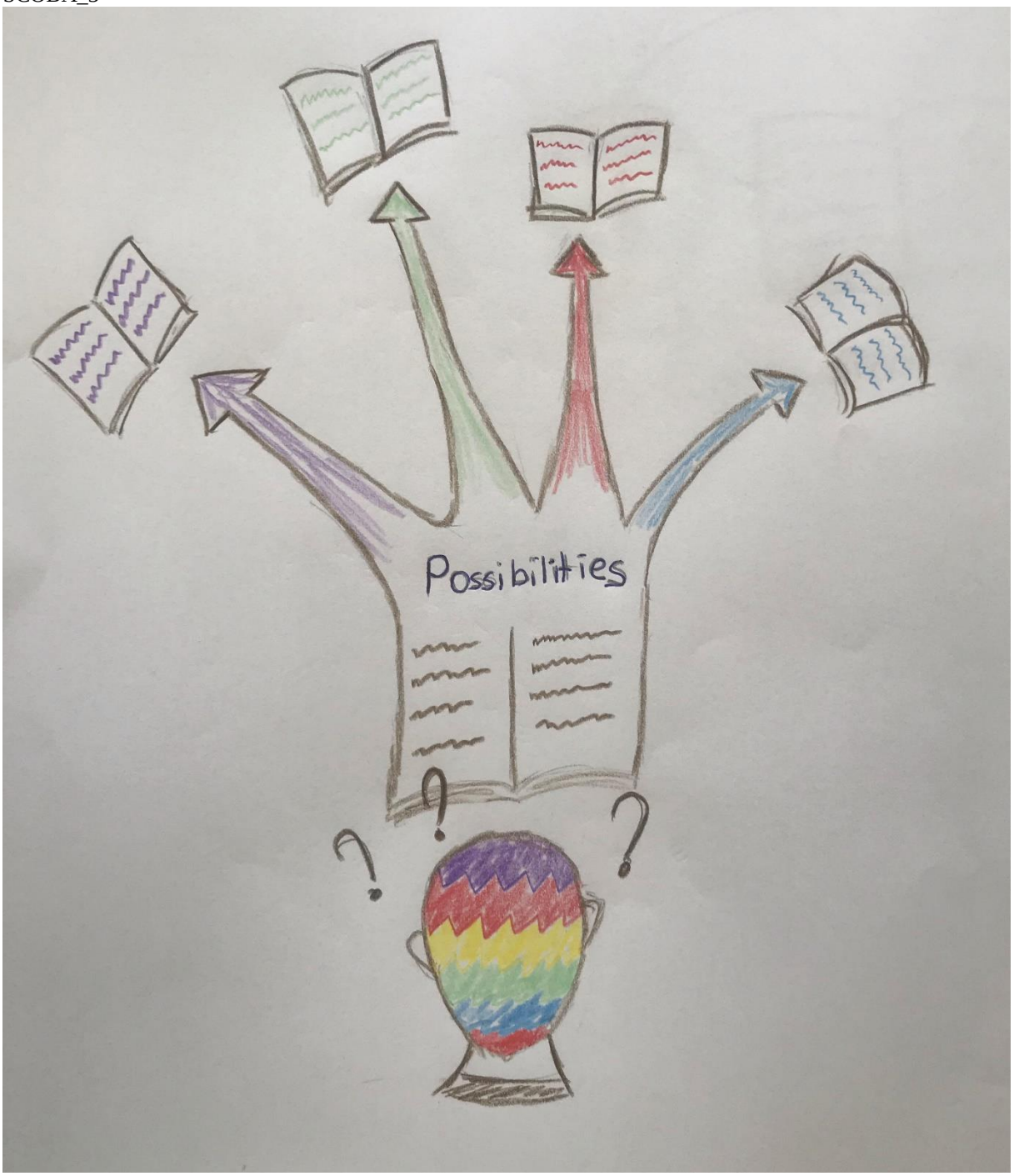
The SCOBAs created by the SCOBA group
SCOBA_1



SCOBA_2



SCOBA_3



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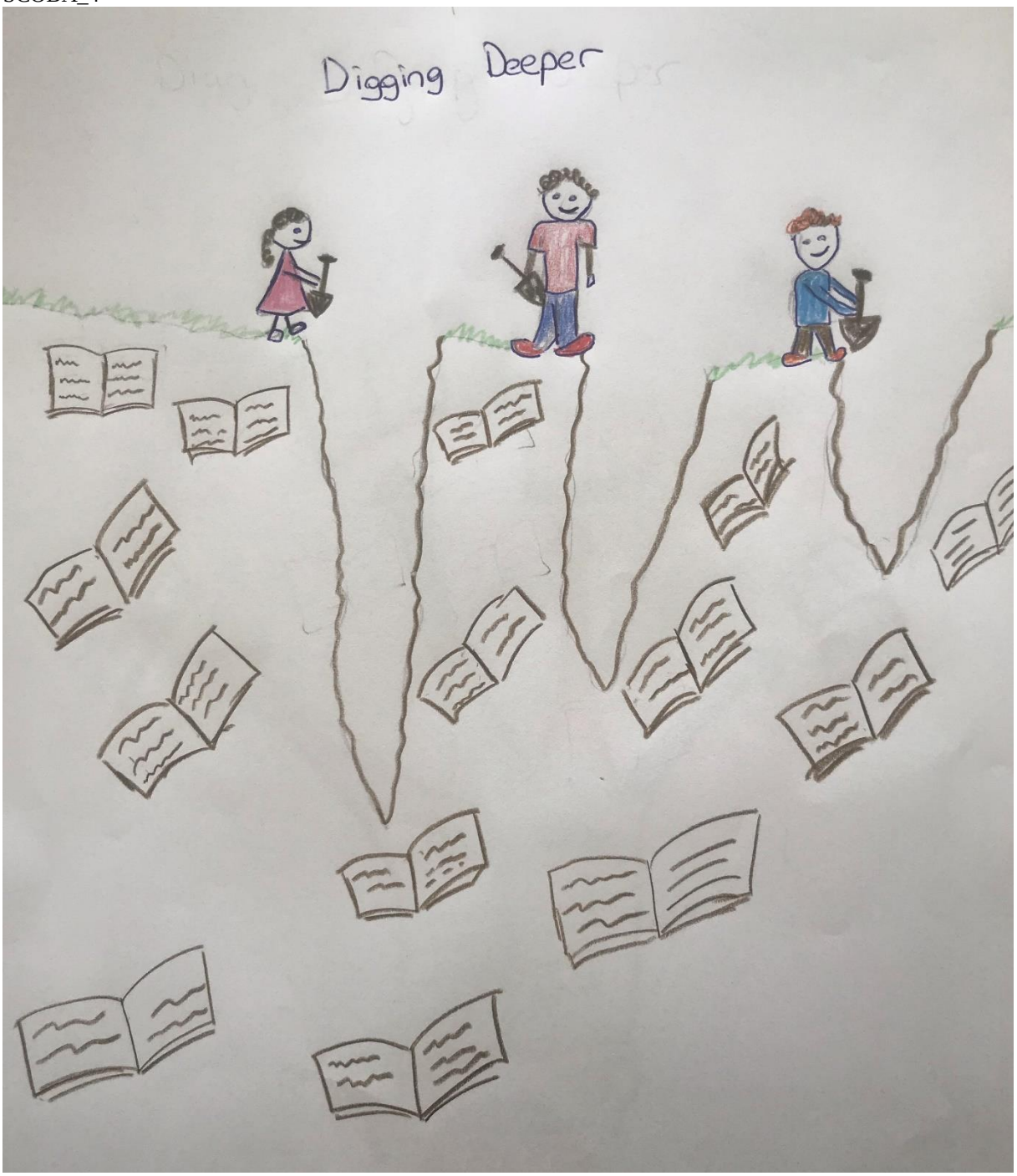

APPENDIX B

The assumptions of the one-way repeated ANCOVA test were met in this study. The normality assumption was satisfied as indicated by the Shapiro-Wilk's test, showing that the residuals were normally distributed within each group (ps < .05). The homogeneity of variance assumption was met, as there was equal variance across the groups, as confirmed by Levene's test (ps < .05). Additionally, the data did not contain any outliers, and Cook's distance did not violate the assumption. As these results suggest that the one-way repeated ANCOVA tests conducted in this study were appropriate and reliable for testing the effects of the intervention on the four variables of interest (see Table 4).

Table 4. Descriptive Statistics for Pre- and Post-Test Measures of Four Dependent Variables in Experimental and Control Groups

				95% Confidence Interval			Shapiro-Wilk	
Variable	**Group**	**Mean**	**SE**	**Lower**	**Upper**	**SD**	**W**	**p**
Pre_reading_Score	Experimental Group	10.81	0.77	9.23	12.40	4.01	0.97	0.570
	Control Group	11.32	0.52	10.26	12.38	2.58	0.97	0.610
Post_reading_Score	Experimental Group	13.74	0.57	12.56	14.92	2.98	0.97	0.612
	Control Group	13.76	0.42	12.90	14.62	2.09	0.94	0.150
Pre_Reflective_Reading_Score	Experimental Group	3.33	0.40	2.50	4.16	2.09	0.94	0.144
	Control Group	2.80	0.29	2.20	3.40	1.44	0.93	0.106
Post_Reflective Reading Score	Experimental Group	4.63	0.33	3.95	5.31	1.71	0.96	0.349
	Control Group	4.72	0.32	4.06	5.38	1.59	0.96	0.411
Pre_RQ_Reflection	Experimental Group	12.70	0.49	11.69	13.71	2.55	0.96	0.284
	Control Group	13.52	0.40	12.69	14.35	2.00	0.96	0.419
Post_RQ_Reflection	Experimental Group	16.11	0.47	15.15	17.07	2.42	0.97	0.573
	Control Group	14.80	0.38	14.01	15.59	1.91	0.98	0.835
Pre_RQ_CriticalReflection	Experimental Group	10.15	0.57	8.98	11.31	2.94	0.97	0.630
	Control Group	10.44	0.63	9.13	11.75	3.16	0.97	0.523
Post_RQ_CriticalReflection	Experimental Group	12.30	0.60	11.07	13.52	3.10	0.98	0.888
	Control Group	10.00	0.71	8.53	11.47	3.57	0.94	0.138

				95% Confidence Interval			Shapiro-Wilk	
Variable	**Group**	**Mean**	**SE**	**Lower**	**Upper**	**SD**	**W**	**p**

Note: The table presents descriptive statistics for the experimental and control groups' pre-and post-test measures of four dependent variables. The four variables include Reading Score, Reflective Reading Score, Critical Reflection, and Reflection. The table shows the mean scores, standard deviation, standard error of the mean, 95% confidence intervals, skewness, and kurtosis for each variable in both groups. The Shapiro-Wilk test for normality is also reported for each variable. These statistics provide a summary of the distribution of scores for each variable and the variability and shape of the distribution in each group. This information can help evaluate the intervention's effectiveness and determine if there are any significant differences in the mean scores of the dependent variables between the experimental and control groups. And The CI of the mean assumes sample means follow a t-distribution with N - 1 degrees of freedom

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An Examination of How Toxic Leadership Behaviors of School Principals Relate to Teachers' Perceived Stress

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Abstract
The study examines how the toxic leadership behaviors of school principals relate to teachers' perceived stress. It is a correlational survey model, and the sample consists of 278 primary and secondary school teachers. We collected the data with the Perceived Stress Scale and Toxic Leadership Scale. The findings show that gender does not cause a statistical difference in perceived stress and all dimensions of toxic leadership. The stress levels of branch teachers are higher than those of primary school teachers, with a statistically significant difference. The perception of branch teachers in terms of ignorance, self-interest, and a negative mental state of toxic leadership is significantly higher than that of classroom teachers. A moderately significant positive relationship exists between teachers' perceptions of stress and all dimensions of toxic leadership. 20% of teachers' perceptions of stress are explained by toxic leadership. The negative mental state of school principals is a significant predictor of teachers' perceptions of stress.

Keywords: Stress, Toxic leadership, Toxic behavior, Teacher, School principal

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Introduction

Stress is a phenomenon that individuals frequently experience in their lives today. As a result of what individuals experience in their social and professional lives, the reactions they develop physically and psychologically affect their lives as a reflection of the stress they experience. Although it is possible to observe the effects of stress on an individual, it is stated that it is not easy to define it to this extent. The French physiologist Bernard, who dealt with the concept of stress in its present meaning, declared that the living organism must maintain its internal integrity in the face of external environmental changes to which the living organism is exposed. Thus, the "balancing the internal structure" principle was introduced to medical science. In 1910, Osler associated stress with "intense work and anxiety," and in 1925, Cannon used the word stress in the examination of "fight or flight" reactions under laboratory conditions (Baltaş & Baltaş, 2017). In the 20th century, physiologist Dr. Hans Selye, who conducted essential studies on stress in 1936, started his research on experimental rats under laboratory conditions and found that stress is a physiological syndrome (Viner, 1999).

Selye explains stress as a non-specific reaction of the body as a result of demands or pressures to which the individual is exposed, states that stress is the most important psychological problem that neutralizes the physiological and biological systems, and emphasizes that stress is not a simple nervous state or a non-specific result of damage (Selye, 1973). Stress is an emotional state pattern and psychological reaction that occur when individuals perceive a situation threatening their goals or important objectives (Baron & Greenberg, 1990, p. 226). Within the framework of these definitions, it can be said that stress is a response that occurs in the body against the effect, and it is a psychological tension that affects individuals' behavior and their relations with other people. Sources of stress can be analyzed in three groups: individual, environmental, and work-related. Personality traits, family, and economic problems are examples of individual factors that cause stress (Robbins & Judge, 2012), while factors such as the structure of society, globalization, relocations, race, and gender can be given as examples of environmental factors (Luthans, 2008). The third important factor, also known as organizational stress or workplace stress, is expressed as a situation that occurs when individuals face demands and pressures in their workplaces that are unsuitable for their knowledge and abilities (Stavroula et al., 2003). A study conducted on the factors causing stress concluded that the most significant source of stress is work. The second factor is income status, which is also related to the individual's job (Robbins & Judge, 2012). Organizational stressors include management policies and strategies, organizational structure, organizational processes, and working conditions (Luthans, 2008). Time pressure to complete the job, excessive responsibility, unfair practices, and unnecessary procedures can cause stress in business life (Cherrington, 1989).

Although stress is generally considered to be negative, the encouraging effect of stress on the individual is also mentioned. Accordingly, stress can also be grouped as constructive or destructive stress. Destructive stress (distress) affects the individual negatively and causes employees to be unable to fulfill their functions in the working environment. Constructive stress, called eustress, motivates the individual and increases work performance. While a moderate level of stress boosts productivity, a high level of stress decreases the performance of employees and impairs their physical and mental systems. In such an employee, situations such as absenteeism, leaving work, making mistakes, accidents, and dissatisfaction occur (Luthans, 2008).
As in many professional groups, teaching is among the most stressful professions (Stoeber & Rennert, 2008; Tekin et al., 2019). Work-related stress is among the most prevalent types of stress among teachers (Austin et al., 2005; Harmsen et al., 2018; Kaplan, 2021). Since teacher stress is a complex psychological phenomenon (Hu et al., 2019), many factors can be expressed as stressors. Workload (Altınok, 2009; Kyriacou, 2001; Zhang & Zhu, 2007), self-efficacy perceptions (Çolak, 2019), financial opportunities (Arıcan, 2011; Yolbakan, 2019), low social status (Özbaş, 2019), biased behaviors (Arıcan, 2011; Aydın, 2016), parental and student pressure (Stoeber & Rennert, 2008), perceived injustices in evaluation (Altınok, 2009; Arıcan, 2011), unfavorable incidents involving the structure and functioning of the school (Aslan & Ağıroğlu-Bakır, 2018; Kyriacou, 2001), school's environment (Bottiani et al., 2019), school's type (Moğul, 2014) are among the causes of teacher stress. Teacher stressors can arise from career development, organizational role, organizational structure and climate, relationships at work, and the job itself (Karadavut, 2005). Aydın (2016) also stated that teachers' stress sources are caused by the education system, administrators and inspectors, students, and the task. Among the reasons arising from administrators and inspectors were weak management skills, conflicts between subordinates and superiors, the inability to create a democratic environment in the school, and the lack of opportunity to participate in management.

Teachers' stress levels are affected by both in-school and out-of-school factors. In-school factors may arise from colleagues, administrators, parents, students, etc. in various ways. Among these, especially the negative attitudes and behaviors exhibited by school administrators affect teachers. These negative behaviors, which can be associated with toxic leadership (TL) in the literature, can be explained by the school administrator's unworthiness, self-interest, negative mental state, and selfishness (Çelebi et al., 2015). TL is a concept that seriously damages

the followers and organizations they are in with the leaders' negative personal characteristics and destructive behaviors (Lipman-Blumen, 2005, p. 44). Toxic leaders exhibit traits including egotism, moral failing, ineptitude, and neuroticism (Green, 2014). Schmidt (2008) states that the factors of TL are "self-promotion, abusive supervision, unpredictability, narcissism, and authoritarian leadership." According to Reed (2004, p. 67), the three main characteristics of TL are (i) disregard for the welfare of the workforce, (ii) a character trait or method of communication that harms the working environment, and (iii) putting self-interest first.

Research on TL provides information about the negative reflections of TL on the organization and employees. It is seen that TL creates a toxic school culture (Kırbaç, 2013), has a negative relationship with school climate (Tepe & Yılmaz, 2020), teacher performance (Mammadova, 2021), psychological capital level (Bahadır & Kahveci, 2020), organizational happiness (Bakır, 2022), organizational commitment (İlhan & Çelebi, 2021), and burnout (Çetinkaya & Ordu, 2017). The increase in TL increases teachers' organizational cynicism (Demirel, 2015) and silence (Demirtaş & Küçük, 2019). TL has psychological, emotional, and physical effects on employees (Snow et al., 2021). In interviews with teachers, physical effects such as exhaustion, insomnia, feeling sick, migraine, weight gain, lack of energy, and substance abuse; emotional effects such as fear, anger, helplessness, and insecurity; and psychological effects such as loss of trust, stress, and depression were identified among the effects of TL (Snow et al., 2021). Teachers exposed to TL develop negative emotions within the school, cut off communication with the principal, distrust the principal, decrease organizational citizenship behaviors and self-efficacy perception, and feel worthlessness and hopelessness (Koçak & Demirhan, 2023).

Leaders' actions have a significant impact on the stress levels of their followers (Harms et al., 2016). In research looking at the relationship between TL and job stress in a sample of knowledge workers (Hadadian & Zarei, 2016) and enterprises (Bakan et al., 2020), it was discovered that there is a positive correlation between the concepts. In other words, as the TL of managers increases, the stress perceived by employees increases. The increase in stress leads to a decrease in employees' organizational commitment (Kahveci et al., 2019; Turhan et al., 2018), professional satisfaction (Alıcı & Yalçınkaya, 2019), job satisfaction (Choi & Kim, 2016; Tipi, 2022), job satisfaction, and motivation (Ertuğrul, 2021). As stress deepens, alienation from work increases (Şimşek & Can, 2022). Thus, the significance of leadership becomes evident as studies examining leader behaviors and employee stress underscore the crucial role of effective leadership. Considering the detrimental impact of stress on organizations, it is crucial to investigate the stress experienced by teachers due to leaders in educational organizations. This principal behavior negatively affects teachers and the school's ability to achieve its goals, as in other organizational areas. Due to this importance and the limited number of studies addressing this relationship in schools in the existing literature, this research aimed to examine the relationship between toxic leadership behaviors of school principals and teachers' perceived stress. Thus, it will benefit relevant literature and practitioners by drawing attention to the reflection on school principals' negative behaviors toward teachers. The research will also be helpful for taking preventive measures in this context. We have sought to answer the following research questions:

1. Do the perceived stress levels of teachers significantly differ in terms of gender, subject, and seniority variables?
2. Do teachers' perceptions of school principals' TL behaviors significantly differ in terms of gender, subject, and seniority variables?
3. Is there a significant correlation between school principals' TL behaviors and teachers' perceived stress?
4. Are school principals' TL behaviors a significant predictor of teachers' perceived stress?

Method

Research Design

We used the correlational survey model in the current study. This model is employed to ascertain the status and strength of the relationship between two or more variables (Büyüköztürk et al., 2012). The dependent variable in the study is the perceived stress by teachers, and the independent one is the perceived TL behaviors of school principals by teachers. In addition, gender, subject, and professional seniority were also included in the study as independent variables.

Sample

The population of the research consists of 7300 primary and secondary school teachers in three districts of Kayseri province (Melikgazi, Talas, and Kocasinan). The sample included 305 teachers, determined by cluster sampling.

In preparing the data for analysis, the data of 278 teachers was processed due to the removal of extreme values. The characteristics of the participants are presented in Table 1.

Table 1. The characteristics of teachers

	Variable	*f*	*%*
Gender	Female	140	50.4
	Male	138	49.6
School	Primary	130	46.8
	Secondary	148	53.2
Subject	Branch	172	61.9
	Classroom	106	38.1
Marital status	Single	32	11.5
	Married	246	88.5
Seniority	1-10 yıl	56	20.1
	11-20 yıl	119	42.8
	21 yıl ve üzeri	103	37.1

Data Collection Tools

We collected the data with the "Perceived Stress Scale" (PSS) and "Toxic Leadership Scale" (TLS), along with the “Personal Information Form.”

Personel Information Form

In the personal information form, teachers were asked about gender, type of school, field of study, and professional seniority.

Perceived Stress Scale

Cohen et al. (1983) developed the PSS to determine people's perceptions of stress. PSS, translated into different languages in the international literature, has been adapted into Turkish by different researchers. Eskin et al.’s (2013) adaptation was used in this study. The consistency coefficients of the 14, 10, and 4-item forms of PSS are 0.84, 0.82, and 0.66, respectively. As a result of factor analyses, it is stated that PSS-14 and PSS-10 consist of two dimensions. The factor names are stress/distress perception and insufficient self-efficacy perception. The stress/distress items include feeling irritable and stressed, angry because of events beyond one's control, and feeling that problems are too much to overcome. For the insufficient self-efficacy dimension, feeling that one cannot cope effectively with essential changes in their life and realizing that one cannot manage the things that need to be done can be given as examples. We used the stress-distress dimension of the scale in the current study. The Cronbach's alpha of stress and distress is .84, and insufficient self-efficacy is .82.

Toxic Leadership Scale

TLS was developed by Çelebi et al. (2015) to measure the TL behaviors of school principals. It has 30 items in four sub-factors. These are named unappreciation, self-interest, selfishness, and negative mental state, and Cronbach alpha coefficients were calculated as .92, .94, .93, and .89, respectively. In the present study, these values of the sub-dimensions of TLS are .95, .95, .93, and .91, respectively. TLS is a 5-point Likert scale, and the higher the score, the higher the TL trait of the school principals.

Data Analysis

In the data analysis process, unidirectional and multidirectional outliers were removed to prepare the data set for analysis. The Kolmogrov-Smirnov test, kurtosis-skewness values, and histogram graphs were analyzed to interpret the normal distribution of the data set. Skewness and kurtosis values between -1.5 and +1.5 (Tabachnick & Fidell, 2012) indicate that the normality assumption will be met. Since the values shown in Table 2 are within these limits, it was accepted that the normality assumption was complete, and parametric tests were used. In addition to the normality assumptions across the sub-factors, the normality of the distribution was also examined according to the independent variables. In the gender variable, skewness values range between 0.022-0.087, and kurtosis values range between 0.081-0.410; in the subject variable, skewness ranges between 0.087-0.107, and kurtosis ranges between 0.059-0.148. In the seniority variable, all assumptions of the analyses preferred for each research question were tested.

Table 2. Skewness and kurtosis values for sub-factors

Sub-factors	Skewness	Kurtosis
Unappreciation	.761	.110
Self-interest	.756	-.013
Selfishness	.575	-.353
Negative mental state	.754	-.320
Stress	.208	-.078

In data analysis, frequency (f), percentage (%), mean, and parametric tests like “Independent Sample T-Test, One Way Analysis of Variance (ANOVA), Pearson Correlation Coefficient (r), and Multiple Linear Regression Analysis (MLRA)” were used. A 0-0.29 weak, 0.30-0.69 moderate, and 0.70-0.99 high-level, robust relationship classification was used to interpret the correlation coefficient (Büyüköztürk et al., 2012). For the effect size in the t-test, Cohen's d coefficient was depicted as 0.2 (small), 0.5 (medium), and 0.8 (big) (Cohen, 1988). After we concluded that the data were close to a normal distribution, there were no extreme values in the data set, and there was no multicollinearity problem among the independent variables, the analysis was started. We used the SPSS 22 program in all statistical analyses.

Findings

First of all, confirmatory factor analyses of both scales were performed. The results obtained for the PSS (X^2/df=3.53; GFI=.995; CFI=.993; NNFI=.989; TLI=.989; RMSEA=.096 and SRMR=.060) good and acceptable fit values and the TLS (X^2/df=1.67, GFI=.997, CFI=.999, NFI=.997, TLI=.999, RMSEA=.050 SRMR=.038) showed good fit values. Next, descriptive data on the dimensions were examined (Table 3).

Table 3. Descriptive statistics on teachers’ stress levels and TL

Factors	Minimum	Maksimum	$\bar{X}$	Ss.
Stress	1.29	4.57	2.80	.64
Unappreciation	1.00	4.10	1.83	.72
Self-interest	1.00	4.56	1.91	.79
Selfishness	1.00	4.60	2.08	.86
Negative mental state	1.00	4.40	2.01	.87

According to the mean scores of teachers in the stress-distress dimension ($\bar{X}$=2.80), it can be said that the stress they perceived was moderate. According to the teachers, the TL behaviors of school administrators are mostly selfishness (X=2.08), followed by negative mental state ($\bar{X}$=2.01), self-interest ($\bar{X}$=1.91) and unappreciation ($\bar{X}$=1.83).

Table 4 shows the findings to compare the perceived stress of primary and secondary school teachers according to gender and subject. We found no significant difference in the stress-distress dimension [$t(276) = 0.21$, $p > .05$] in terms of gender. However, a significant difference was found in the stress-distress dimension [$t(276) = 2.606$, $p < .05$] in terms of subject. The stress-distress scores of branch teachers are greater when the mean scores are examined. However, the effect size is low.

Table 4. Differences between teachers’ perceived stress by gender and subject

Factor	Variable	N	$\bar{X}$	Ss.	*t*	*sd*	*p*	*Cohen d*
Stress	Female	140	2.81	0.62	0.21	276	.834	-
	Male	138	2.79	0.66				
	Branch Teacher	172	2.88	0.62	2.606	276	.010	0.32
	Classroom Teacher	106	2.67	0.65				

Table 5 shows the results of the ANOVA conducted to determine the differences in teachers’ perceived stress and TL perceptions in terms of professional seniority. Firstly, Levene test results were examined to test the assumption of homogeneity of variances, and it was seen that the assumption of homogeneity of variances was met in all dimensions. Teachers’ TL perception did not differ statistically in all sub-dimensions in terms of their professional seniority ($p > .05$).

Table 5. Differences of teachers' perceived stress levels and TL perceptions in terms of professional seniority

Factors Variance	Variance	Sum of squares	*df*	Mean sum of squares	*F*	*p*
Stress	Between group	1.873	2	.937	2.304	.102
	Within group	111.791	275	.407		
Unappreciation	Between group	.265	2	.132	.252	.777
	Within group	144.387	275	.525		
Self-interest	Between group	.387	2	.194	.307	.736
	Within group	173.600	275	.631		
Selfishness	Between group	.128	2	.064	.085	.918
	Within group	206.683	275	.752		
Negative mental state	Between group	.607	2	.303	.397	.672
	Within group	209.854	275	.763		

T-test results were conducted to determine the differences in participants' perceptions about the TL behaviors of school principals according to gender. No significant difference was found in teacher views in the unappreciation [$t(276) = -1.149$, $p > .05$], self-interest [$t(276) = -1.081$, $p > .05$], selfishness [$t(276) = -0.219$, $p > .05$], and negative mental state [$t(276) = -0.317$, $p > .05$] dimensions. In other words, the views of female and male teachers were similar in all four dimensions of TL.

Table 6. Differences in TL perceptions of teachers by gender

Factor	Variable	N	$\bar{X}$	Ss.	*t*	*sd*	*p*
Unappreciation	Female	140	1.78	0.69	-1.149	276	.252
	Male	138	1.88	0.74			
Self-interest	Female	140	1.86	0.74	-1.081	276	.281
	Male	138	1.96	0.83			
Selfishness	Female	140	2.07	0.85	-0.219	276	.827
	Male	138	2.09	0.88			
Negative mental state	Female	140	1.99	0.89	-0.317	276	.751
	Male	138	2.0	0.85			

The T-test results of the comparison made in terms of the subject are given in Table 7. While the views of primary school teachers and branch teachers did not show a significant difference in selfishness [$t(276) = 0.93$, $p > .05$], teacher views were found to be significantly different in unappreciation [$t(269.334) = 3.352$, $p < .05$], self-interest [$t(261.268) = 2.083$, $p < .05$], and negative mental state [$t(276) = -2.995$, $p < .05$] sub-dimensions. TL perceptions of branch teachers were higher than the others in these dimensions. The fact that Cohen d values were lower than 0.5 indicates that the effect size is small in all three dimensions.

Table 7. Differences in TL perceptions of teachers in terms of subject

Factor	Variable	N	$\bar{X}$	Ss.	*t*	*sd*	*p*	*Cohen d*
Unappreciation	Branch Teacher	172	1.93	0.79	3.352	269.334	.001	0.41
	Classroom Teacher	106	1.66	0.57				
Self-interest	Branch Teacher	172	1.98	0.86	2.083	261.268	.038	0.26
	Classroom Teacher	106	1.79	0.67				
Selfishness	Branch Teacher	172	2.11	0.84	0.93	276	.353	-
	Classroom Teacher	106	2.01	0.89				
Negative mental state	Branch Teacher	172	2.13	0.89	2.995	276	.003	0.37
	Classroom Teacher	106	1.81	0.79				

The Pearson Product Moments Correlation Coefficient was used to test the relationship between teachers' perceived stress and TL perceptions. All of the correlation coefficients regarding teachers' perceived stress levels and school administrators' TL were found to be statistically significant (Table 8).

Table 8. Correlations between teachers' perceived stress levels and school principals' TL

	Unappreciation	Self-interest	Selfishness	Negative mental state	Stress
Unappreciation	1	.87**	.72**	.76**	.30**
Self-interest		1	.83**	.81**	.34**
Selfishness			1	.81**	.37**
Negative mental state				1	.43**
Stress					1

**$p < .01$; n=278

Perceived stress was found to show moderately positive significant correlations with unappreaciation ($r = .30$), self-interest ($r = .34$), selfishness ($r = .37$) and negative mental state ($r = .43$) sub-dimensions of TL. In other words, the stress-distress levels of teachers were found to increase moderately as school administrators' TL increased.

MLRA was conducted to determine whether TL perceived by teachers was a significant predictor of perceived stress. First of all, the assumptions of the analysis were examined. In order to make this analysis, there should be no issue with the variables' multicollinearity. For this, the variance inflation factor (VIF) must be less than ten, and tolerance values must be greater than 0.1 (Field, 2005). As seen in Table 9, it can be said that MLRA can be performed according to VIF and tolerance values.

Table 9. Regression analysis results for the prediction of perceived stress

Factors	B	Std. Error	β	*t*	*p*	Zero-order	Partial	Part	Tolerance	VIF
	2.181	.099		21.928	.000					
Unappreciation	-.054	.100	-.060	-.535	.593	.300	-.032	-.029	.232	4.315
Self-interest	-.038	.114	-.047	-.333	.739	.336	-.020	-.018	.148	6.743
Selfishness	.065	.080	.088	.808	.420	.366	.049	.044	.252	3.974
Negative mental state	.328	.077	.447	4.282	.000	.433	.251	.233	.272	3.673

F = 16.17, p = .000; R= 0.44, R^2= *0.20*

According to the results obtained in Table 9, unappreciation, self-interest, selfishness, and negative mental state sub-dimensions of TL showed a significant correlation with (R = 0.44, R^2= 0.20) stress-distress dimension (F= 16.17, p < .01). Four variables explain 20% of the stress-distress dimension. The relative order of importance of variables on stress-distress was negative mental state (β = 0.447), selfishness (β = .088), unappreaciation (β = -0.60) and self-interest (β = -0.047). Only the negative mental state variable was a significant predictor of stress-distress when the regression coefficients' significance tests were investigated (p < .05). It was found that one unit increase in the negative mental states of school administrators caused a 0.328-unit increase in teachers' stress-distress perceptions. According to regression analysis results, the regression equation for the prediction of teachers' stress-distress is as follows: Stress-distress = (0.328 x negative mental state) + (0.065 x selfishness) + (-0.054 x unappreciation) + (-0.038 x self-interest) + 2.181.

Discussion and Recommendations

In this correlational survey model study, it was found that teachers have moderate stress. This finding is supported by different studies in the literature (Alıcı & Yalçınkaya, 2019; Bayramoğlu et al., 2020; Çolak, 2019; Khairani et al., 2021; Özgenel & Canuylası, 2021; Şanlı, 2017; Turhan et al., 2018; Tipi, 2022; Yolbakan, 2019). In Karadavut's (2005) study, it was found that while teachers' career development-related stress was high, their job-specific stress level, organizational role, relations at work, organizational structure, and climate-related stress levels were moderate. In addition, there are studies that show that the work-related stress of teachers is high (Kaplan, 2021). Aslan and Ağıroğlu-Bakır (2018) also obtained that teachers experienced a high level of stress in the "progress and development, professional security, professional appearance, organizational opportunities, attitudes and behaviors of students, and attitudes and behaviors of parents" among organizational stressors. In another study, it was seen that primary school teachers had high stress levels in terms of workload and skills, and the researchers attributed this result to what happened in the COVID-19 pandemic (Şimşek & Can, 2022). A sampling of urban schools found that 93% of the teachers reported having a lot of stress at work (Herman et al., 2018). Bottiani et al. (2019) reported that teachers in low-income schools were more stressed. However, stress levels were lower among teachers who felt more self-sufficient and connected to their colleagues. These different results regarding the level of stress support the aspect of stress as a complex psychological phenomenon, as stated by Hu et al. (2019). The stress perceived by teachers in different contexts and conditions may differ. In addition, there are studies that measure general stress perception, as in the present study, and there are studies that measure only work-related stress perception. The same situation can be seen in comparisons made in terms of gender and subject.

We found no statistical difference between the stress perceptions of male and female participants in this study. Stress levels perceived by male and female teachers are close to each other. In parallel with this finding, there are studies showing that gender is not a significant factor in the organizational stress of teachers (Altınok, 2009; Çolak, 2019; Dinç & Cemaloğlu, 2018; Kaplan, 2021; Moğul, 2014; Özbaş, 2019; Özgenel & Canuylası, 2021; Şanlı, 2017; Şimşek & Can, 2022; Tipi, 2022; Yolbakan, 2019). On the contrary, there are also studies indicating that gender is a significant variable in the perception of stress, with some studies indicating that female teachers experience higher stress levels than their male counterparts. There are also studies that found that gender is a significant variable in the perception of stress (Bottiani et al., 2019; Göksoy et al., 2015; Khairani et al., 2021), female teachers experience more parental pressure and workload related stress than male teachers (Çolak, 2019), and female teachers experience higher levels of work-related stress and organizational role-related stress (Kaplan, 2021).

In a study by Şimşek and Can (2022), while it emerged that gender did not cause a significant difference in general organizational stress, it is noteworthy that female teachers scored higher in the workload sub-dimension, while male teachers scored higher in the decision-making sub-dimension. Additionally, a study discovered that female teachers were less stressed than male teachers in the components of participation in decision-making and administrative behaviors (Aslan & Ağıroğlu-Bakır, 2018). Karadavut (2005) found that the organizational stress levels of male teachers were found to be higher. A study in China discovered that male teachers had higher occupational stress levels than female teachers in terms of personal growth, workload, and career expectations (Ji et al., 2021).

When branch and classroom teachers' perceptions of stress were compared, a significant difference between them was discovered. Although the stress perception of branch teachers is higher than that of the others, the effect size is low. Kaplan (2021) also found that branch teachers' perceptions of work-related stress and organizational stress are higher than those of classroom teachers. Çolak (2019), on the contrary, reached the opposite finding and concluded that primary school teachers have a higher perception of stress in the dimensions of principal, physical and work-related conditions, and parental pressure. There are also findings in the literature that the subject does not cause a difference in the perceived stress level (Dinç & Cemaloğlu, 2018; Şanlı, 2017) or in the perception of organizational stress sources (Karadavut, 2005; Özbaş, 2019). There were no appreciable changes in teachers' stress levels according to the professional seniority variable. Although this result is similar to some research findings (Moğul, 2014; Yolbakan, 2019), there are also studies that found that stress differs significantly according to professional seniority. Şanlı (2017) found that teachers with 1–10 years of professional seniority perceived stress significantly higher than those with 21–30 years of seniority. However, Tipi (2022) found that teachers with 16 years and higher seniority were significantly more stressed compared to other teachers, and Kaya (2019) found teachers with 16–20 years of experience were significantly more stressed than those with 6–10 years. Kaplan (2021) also found that the career-related stress of teachers who have 20 years or more seniority is higher than that of participants with 0–5 years of seniority. As with other variables, the results for professional seniority also differ in the literature.

It can be said that teachers' views about school administrators' TL behaviors are at a low level. This result shows that the teachers think the school administrators have low levels of selfishness, self-interest, and unappreciation, and they have a negative mental state. The reason why they think like this can be the fact that school administrators do not refrain from appreciating the efforts of their employees, they are supportive, and they provide a positive working environment for teachers to think in this way. However, as Kırbaç (2013) stated, toxicity spreads systematically and rapidly from the moment it enters the organization. For this reason, although the perceived TL behavior is low, efforts should be made to prevent the spread of toxicity. These results are also supported by the results of previous research conducted with teachers (Bahadır & Kahveci, 2020; Bakır, 2022; Çetinkaya & Ordu, 2017; Demirel, 2015; Demirtaş & Küçük, 2019; Ertuğrul, 2021; Küçük & Demirtaş, 2021; Mammadova, 2021). However, İlhan and Çelebi (2021) and Kahveci et al. (2019) found a moderate level of TL perception in teachers. Snow et al. (2021) found that teachers had an above-average score of TL perception. Similarly, Green (2014) found that the majority of the participants (90%) in educational organizations work with toxic leaders.
Although TL perceptions of teachers are low, their mean score makes it possible to rank the four dimensions of TL. The teachers think that administrators have the highest tendency to selfishness within the scope of TL behaviors, followed by negative mental states, self-interest, and unappreciation, respectively. It is also observed in previous research findings that the mean selfishness score is higher than the others (Bahadır & Kahveci, 2020; Snow et al., 2021). In some studies (Çetinkaya & Ordu, 2017; Demirel, 2015; Ertuğrul, 2021; Karlı, 2022), mean scores of negative mental states were found to be higher than the other sub-dimensions. The highest score in İlhan and Çelebi's (2021) study was in the unappreciation sub-dimension.

It was found that the perceptions of teachers did not differ by gender. In other words, male and female teachers had similar views on school administrators' TL behaviors. This result is in parallel with the studies of Bahadır and Kahveci, (2020), Bakır (2022), Çetinkaya and Ordu (2017), Mammadova (2021), and Ertuğrul (2021). In the study by İlhan (2019) and Demirel (2015), it was found that female teachers thought that principals showed more TL behavior in the dimensions of unappreciation and negative mental state. In the study conducted by Karlı (2022), in all four dimensions of TL, women thought that school administrators showed TL characteristics in a significant way compared to men. Küçük (2020), however, found the scores of male teachers in narcissism to be higher.

In the comparison made according to the subject variable, no difference was found between primary school and branch teachers in selfishness. In the dimensions of unappreciation, self-interest, and negative mental state, the opposite is true, and branch teachers think that school administrators show more unappreciation, self-interest, and

a negative mental state. Contrary to this result, no significant difference was found in four factors in the study of Demirel (2015), Çetinkaya and Ordu (2017), Küçük (2020), and Mammadova (2021) according to the subject.

It was discovered that the perceptions of teachers were unaffected by their level of professional experience. This finding is also supported by previous research results (Çetinkaya & Ordu, 2017; Demirel, 2015; Küçük, 2020; Snow et al., 2021). In other words, the perceptions of teachers do not change in terms of seniority. Conversely, Bakır (2022) and Ertuğrul (2021) found that professional seniority was a determining variable in dimensions other than the dimension of unappreciation. According to Bakır's (2022) research, teachers with a seniority of 6 to 10 years thought their school principals were less caring and more self-serving than those with a seniority of 16 years or more. Compared to teachers with seniorities of 11–15 years and 16 years or more, teachers with seniorities of 6–10 years believed that school principals had a more depressed mental state. In Ertuğrul's (2021) study, it was found that TL perceptions of teachers with 6–10 years of seniority in the dimensions of self-interest and selfishness were at a higher level than those of teachers with 11–15 years. In the negative mental state sub-dimension, TL perceptions of teachers with a seniority of 6–10 years were at a higher level than the other seniority levels. Karlı (2022) found a difference in terms of seniority in all dimensions of TL. The participants with 6–15 years of experience thought that principals were more unappreciative, self-interested, selfish, and had a negative mental state compared to teachers with 0–5 years of experience. In İlhan's (2019) study, teachers with 11–15 years of professional seniority had a higher TL perception than those with 6–10 years of seniority. In the current study, professional seniority was not found to be a determining variable, and there are studies supporting this result. On the other hand, there are studies that have determined that the perception of TL behaviors of principals increases as professional seniority increases.

The reported stress levels of teachers and school administrators were found to be statistically significantly positive and moderately correlated across every category. It can be said that as school principals' TL behaviors increase, teachers' stress-distress level will increase moderately. Among the four sub-dimensions of TL, the dimension that showed the highest relationship with stress was negative mental state. As the negative mental state of school administrators increases, teachers' perceived stress increases. Parallel results have been obtained in studies performed in different areas such as businesses, the health sector, and law enforcement (Aktürk & Demirbağ, 2022; Bakan et al., 2020; Gök, 2023; Hadadian & Zarei, 2016), and positive, medium, or high levels of relations were found between work stress and TL. The last finding of the research showed that unappreciation, self-interest, selfishness, and negative mental state sub-dimensions of TL explain 20% of teachers' stress and distress. In other words, one unit increase in the TL behavior of school administrators increases teachers' perceptions of stress and distress by 20%. However, only the negative mental state among the variables is a significant predictor of teachers' perceptions of stress and distress. These results show that the negative actions and statements of school administrators and their mental states are a source of stress for teachers. Destructive leadership increases teachers' organizational stress. While it is seen that destructive leadership increases organizational stress of teachers (Özgenel & Canuylası, 2021), school administrators with cynical and rejecting humor style cause stress in teachers (Dinç & Cemaloğlu, 2018), negative correlation of leader-member interaction (Nufer, 2012), and supportive leadership of school principals (Hu et al., 2019) with stress support the findings of this study. While the principal's positive behaviors and interactions reduce teachers' stress, their negative behaviors have the opposite effect. In addition, the fact that there is a high level of positive correlation between the TL behaviors of school principals and the cynicism attitudes of teachers and that 49.7% of organizational cynicism can be explained by TL (Demirel, 2015), the increase in school effectiveness as the perception of TL decreases (Küçük, 2020), and the negative effects of TL on motivation and job satisfaction (Ertuğrul, 2021) show that the leader's toxic behaviors do not only cause stress but also harm the teacher and school. In the study by Gök (2023), it was found that TL perceptions explained approximately 12% of job stress. In a study conducted in the police force (Aktürk & Demirbağ, 2022), it was found that the relationship between employees' work stress and physical and mental health issues could be mediated by harsh supervision by superiors. In the study of Bakan et al. (2020), it was seen that self-praise explained 9.2% of perceived stress, while malicious surveillance explained 12.2%, unpredictability explained 17.1%, narcissism explained 9.0%, and authoritarian leadership explained 12.6%. These studies conducted in different fields show that the toxic behaviors of the leader are effective in reducing the stress of employees.

Regarding the limitations of the research, the fact that a complex psychological phenomenon such as stress was measured on a scale over a period of time can be stated as a limitation. It can be suggested that future research examine the relationship between the two concepts with longitudinal designs. In keeping with the research's conclusions, it can be said that it is extremely essential for principals to avoid this form of leadership since TL has an effect on teachers' perceived stress. Understanding the connection between toxic leadership and stress is essential for improving school performance and many other positive outcomes. The principal's avoidance of such

behavior and adoption of healthier leadership approaches can increase both the leaders' and teachers' well-being. For this reason, awareness studies on TL behaviors and prevention of TL may be beneficial in fighting TL. Moreover, school principals can reduce toxic leadership behaviors by improving emotional intelligence, effective communication, and management skills. Also, rehabilitation support can be offered to principals with TL tendencies and teachers who have been exposed to TL behaviors. Research can be conducted on the issues that trigger the TL behaviors of school principals. It can be said that conducting meta-analysis studies on TL and stress will contribute to the field due to the results obtained in the current study and previous studies regarding gender, subject, and professional seniority. Due to the differences in the perception of stress and TL in terms of subject, conducting qualitative research with branch teachers may contribute to finding out the underlying causes of the perception.

Author (s) Contribution Rate

The contribution rates of the authors are equal.

Ethical Approval

Ethics permission (27.05.2022 / 2022-545) was obtained from "Ondokuz Mayıs University Social and Human Sciences Ethics Committee" for this research.

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A Needs Analysis Study on Interdisciplinary Gender Equality Education: Turkish Context[1]

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Abstract
The purpose of this research was to identify the need for gender equality education. For this purpose, the views of mathematics, science, and information technology teachers on the current situation of gender equality in schools were determined. In addition, the awareness of sixth, seventh and eighth grade middle school students on gender equality was examined. This study was a descriptive research conducted in a qualitative context. In data collection, an interview form on teachers' views and a written view form on students' awareness about gender equality were used. Research data were collected in the spring semester of the 2017–2018 academic year. As a result of the research, it is thought that an interdisciplinary gender equality education will be beneficial to improve students' awareness.

Keywords: Gender equality education, Mathematics teachers, Science teachers, İnformation technologies teachers, Middle school students, Needs analysis

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Introduction

In the world we live in, differences between people such as race, class, gender, and age can lead to various problems regarding equality and social justice in the social area. It is stated that people with individual diversities are exposed to various inequalities in accessing resources and opportunities due to their physical, mental, gender, ethnicity, belief, and cultural differences (Uzunaslan & Tek, 2019). Within these differences, one of the most influential in a social context is gender inequality. "Gender inequality," as the matter through which equality is most emphasized and discrimination takes place the most, results from society's perception of women and men (Özkan, 2020). When research and statistical data concerning this subject are analyzed, it could be asserted that there are various problems regarding gender inequality within the Turkish context. Türkiye ranks 129th among 146 countries in terms of gender gap index, according to the Global Gender Gap Report 2023 ranking (World Economic Forum [WEF], 2023). Türkiye is behind European Union countries regarding the gross enrollment rates of girls at all levels of education, the gender equality index, and the expected years of education of girls from primary to tertiary education (Maya, 2013). When the net enrollment rate in tertiary education is analyzed, this rate is 40.6% for men and 46.3% for women (Turkish Statistical Institute [TURKSTAT], 2021a). According to this data, the enrollment rate of women in tertiary education is higher than men's. However, analyzing the employment rates, the employment rate of women is seen to be lower than half of men's: According to the Household Labour Force Survey, the employment rate was 28.7% for women and 63.1% for men in Türkiye in 2019 (TURKSTAT, 2021c). When the data on R&D employment is examined, 68.1% of the sectoral distribution by gender is men and 31.9% is women (TURKSTAT, 2021b). Although women have shown presence in the fields of science, technology, engineering, and mathematics since the establishment of universities in Türkiye, they face invisibility in job markets and occupational areas due to their traditional gender roles (Öztan & Doğan, 2017). Based on this, it can be said that there are inequalities in different fields regarding gender.

Gender inequality can be experienced not only among adults but also among children and young people. Students come to school with their beliefs concerning their age, ethnicity, physical features, sex, neighborhood, and other variables, and these beliefs are composed of knowledge of a certain network they are part of and their past experiences (Beane, 1990). Lack of knowledge about diversity can make students vulnerable to conforming to social actions that promote discrimination and prejudice (Tolentino, 2009). For instance, it is stated that gender-based occupational stereotypes started to form in primary school years; that creates a basis for gender inequality in society and the business world, and therefore, it is significant that these gender-based occupational stereotypes are addressed from the early stages of life (Çimşir & Akdoğan, 2020). Problems such as sexism, old age, and socio-economic class should be dealt with, and we should hear the voices of silenced people or those whose voices we do not hear, such as women, the poor, and disabled people (Miner, 1995). Besides, schools should adapt to the problems that may arise from the gradual increase of diversity within societies in terms of language, religion, and culture, and arrangements should be made in this regard (Ragnarsdóttir & Blöndal, 2014). It is stated that in many countries, as in Türkiye, one of the venues for reactions to gender equality is schools, and anti-gender movements continue in Latin America, Europe, and Türkiye (Şahin, 2020). Also, in various studies in this regard, it is indicated that students have deficiencies regarding equality value (Acar Erdol & Gözütok, 2017; Bağçeli Kahraman & Başal, 2011; Kalaycı & Hayırsever, 2014; Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014; Yeşil & Balcı Karaboğa, 2021; Yolcu, 2021; Yolcu & Sarı, 2018); gender inequality takes place at the top ranks through social problems in schools (Turhan Türkkan, Yolcu & Karataş, 2017). There are many studies concerning this topic conducted in Türkiye and these are summarized below.

Various studies have been carried out in Türkiye to determine the current situation regarding gender equality and the need for gender equality education. In a study conducted on seven- to eight-year-old students, it was determined that students had stereotypes about gender when choosing toys (Bağçeli Kahraman & Başal, 2011). In another study on gender equality sensitivity, it was determined that primary school fourth grade students lean toward equality, but they had traditional stereotypes and views on women being weaker and powerless, and in line with this result, it was seen that students' sensitivity towards gender equality needed to be developed (Yolcu, 2021). In a similar study with primary school fourth graders, it was found out that students have gender stereotypes regarding occupations and households (Yolcu & Sarı, 2018). In the study conducted on the gender perceptions of primary school students between the ages of seven and fifteen, it was determined that children's perception of gender changes according to their age period; however, being a man is considered more valuable in every period. In the study, it was also stated that despite all the expressed difficulties of women's roles, the fact that both gender groups expressed that it is more difficult to be a man in terms of the importance of the responsibilities taken in adulthood shows the effectiveness of gender perception (Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014). Through research examining the current situation of middle school students regarding gender equality, it was put forward that middle school students did not know the concept of gender and adopted traditional gender roles (Yeşil & Balcı Karaboğa, 2021). In addition, it has been determined that eighth grade students have views on gender inequality and sexist

approaches are higher, especially at the lower socio-economic level (Kalaycı & Hayırsever, 2014). In a study conducted for high school students, it was found out that students had educational needs on the concept of gender, gender roles and stereotypes, women's participation in decision-making mechanisms, violence against women, and women's participation in business life and income (Acar Erdol & Gözütok, 2017). These mentioned studies are aimed at primary, middle, and high school levels and are few in number. Based on the results of these studies, it is thought that students' awareness of gender equality in formal education should be improved.

It could be said that most of the studies concerning gender equality in education were conducted with pre-service teachers. In one study with pre-service teachers, it was put forward that they need an education for gender equality (Acar Erdol, 2019). In another study in this context, it was found that most pre-service teachers have traditional gender perceptions (Aydemir, 2019). In the results of a different study on this topic, it was determined that the metaphors pre-service teachers brought about related to their gender perceptions included gender inequality, and it was identified that individuals lack fundamental knowledge regarding gender in terms of education (Aslan, 2015). Through a similar study, the views of education faculty students in Türkiye on gender equality were examined, and as a result of the research, it was determined that the perceptions of pre-service teachers that make women dependent on men and consider men superior are at a moderate level, and their views tend to be negative as the grade level increases; gender-related views are affected by variables such as the department they study, the region they live in, and the education level of their parents (Acar Erdol, Özen & Toraman, 2019). In a different study examining pre-service teachers' views on gender equality, it was found out that early childhood pre-service teachers have stereotypes about gender roles (Koyuncu Şahin, Esen Çoban & Korkmaz, 2018). From this point of view, it can be said that pre-service teachers, who are the teachers of the future, have deficiencies in terms of gender equality.

In addition to their responsibilities towards students and parents, schools also have responsibilities towards society (Au, Bigelow, & Karp, 2007). Schools and teachers are agents of socialization (Tolentino, 2009). Personal and social values of individuals are affected by practices in school (Beane, 1990). Schools could become tools for reproducing the discrimination in society (Karp, 2007). Starting from these explanations, it is seen as necessary to take action in order to abolish the problems regarding inequality in social contexts and schools. Besides, the fact that pre-service teachers have stereotypes in this matter leads to the thought of teachers' also having stereotypes and preconceptions related to gender inequality. On the other hand, this situation brings about the possibility that gender equality could continue in schools and could be conveyed to the students via teachers as well. In this respect, the significance of determining the current situation of students regarding gender equality and whether they need gender equality education is increasing.

Along with the current situation analysis and needs analysis studies, there are various studies concerning the examination of curricula and text books in Türkiye regarding gender equality as well. In a study regarding text books, it was detected that the activity in the text book within the Citizenship and Democracy Education course related to the "Towards Equality" subject of the "Democracy Culture" theme was not appropriate for developing awareness in students for gender equality and strengthening it (Kalaycı & Hayırsever, 2014). In addition, it has been determined that women and men in middle school mathematics textbooks in Türkiye are presented with stereotypical descriptions, and the labor force participation rate of women in the texts in these books is lower than that of men (Çelik, Aydoğan Yenmez, & Gökçe, 2019). In another study conducted on textbooks, it was revealed that there are deficiencies in gender equality in sixth grade Turkish textbooks within the sample. It has been observed that there are situations such as gender frequencies, number of occupations, attitudes and behaviors of genders, and male characters having more options than female characters in domestic and out-of-family actions (Güney, 2016). In a similar study, the opposite elements of gender equality and sexist stereotypes in Turkish textbooks for middle school were detected (Kükrer & Kıbrıs, 2017). Besides this, in another study, it was pointed out that there is an emphasis on gender equality in the texts in the primary school fourth grade human rights, citizenship, and democracy textbook; however, in the visuals of the book, there is gender inequality and stereotypes while occupations are being represented (Işık Demirhan, 2021). Through a study concerning curricula in middle school, it was seen that statements on gender in curricula updated in 2017 outnumbered the statements in reorganized curricula in 2018. Additionally, it was found out that even if an important step was taken in cleaning the middle school curricula from the concepts emphasizing gender inequality with the updates in 2018, the studies were found to be insufficient in terms of presenting examples of gender equality (Karakuş, Mutlu, & Diker Coşkun, 2018). In line with these document analyses at issue, it can be said that there are also deficiencies regarding gender equality in textbooks and curricula. Based on this, it is thought that gender inequality could be continued via textbooks and curricula, and these stereotypes could be transferred to students. In this respect, it is considered important to reveal the current situation regarding gender equality in schools.

It could be considered that problems regarding equality and social justice should be at the university level because of their great and difficult nature; however, it is seen as necessary that the education to be carried out in this context be in the education's formative period of perspective-creating skills, that is, in the primary school years (Wade, 2007). Students at the primary school level can understand some inequalities around the world, and education in this subject could be given during the primary education period (Peterson, 2002). In addition, dealing with social matters at the middle school level seems significant (Schniedewind & Davidson, 2006). In a study carried out in Türkiye, it was determined that men generally experience gender discrimination at the middle school level, while women experience discrimination in high school. The ones displaying sexist behaviors in the educational process are mostly teachers, and men are exposed to physical punishment while women face gender discrimination through their educational process (Esen, 2013a). Based on these explanations, it is thought that it would be beneficial to start at the middle school level to determine the current situation regarding gender equality.

Gender equality is recommended to be promoted using a horizontal approach that encompasses all learning activities that allow women and men to develop their talents and be fully represented in society (Örs & Kaya, 2021). STEM (Science-Technology-Engineering-Mathematics) fields are seen as the areas where gender inequality is seen seriously, and inequalities in education and employment in one of these areas could strengthen the inequalities in other fields as well (Beşpınar & Pehlivanlı Kadayıfçı, 2021). The underrepresentation of women in STEM fields is a concern for social scientists and policymakers (Stoet & Geary, 2018). The rate of women in science-based employment is low (Blackwell & Glover, 2007). Hence, addressing the gender equality topic in an interdisciplinary context with mathematics, science, information technologies, and software courses in a gender equality curriculum could contribute to raising awareness in this field.

It is suggested that the values of justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and benevolence be considered both on their own and with other values they are associated with in the learning and teaching process, as well as in the curricula for mathematics, science, information technologies, and software courses applied at the middle school level in Türkiye (Ministry of National Education [MoNE], 2018a; MoNE, 2018b; MoNE, 2018c). In addition, it is recommended to associate values such as flexibility, aesthetics, equality, justice, and sharing with the appropriate attainments, along with the eight key competencies determined in the Turkish Qualifications Framework in the mathematics curriculum (MoNE, 2018c). Gaining the values of equality and justice also takes place as a goal in the curricula for these three courses implemented in Türkiye, and establishing interdisciplinary relations is considered important.

Mathematics education has the potential to develop skills for solving the global challenges that future generations may face (Wright, 2017). It seems necessary for students to learn the relationship between social problems and mathematics in order to realize local, national, and universal inequalities (Spielman, 2008). Besides, it is considered an opportunity to teach subjects such as equality and justice in mathematics courses together with other disciplines (Gutstein et al., 2005). Moreover, mathematics is seen as a significant tool in equality and justice education (Gutstein, 2007). It is stated that people need interdisciplinary knowledge between mathematics and equality in order to realize the relationship of inequalities in their daily lives with mathematics (Tanase & Lucey, 2015). In this sense, a mathematics course could create an important opportunity to gain awareness regarding gender equality.

Examining the literature concerning science education, it is seen that female and male students have reached the conclusion that science is a study subject and career path suitable for only men, as the representation of women is at the minimum level in science teaching curricula and materials (Sanders, 1997; Hammrich, 1997; American Association of University Women, 1998; Halpern et al., 2007; Hill et al., 2010). Social justice education is not theorized enough in science education (Dimick, 2012). Even if science television, science clubs, and maker fields are important places for some young people and adults to enjoy and engage in science, the matter of normative social structures over who could do science still remains and restricts powerful social justice and inclusive practices (Dawson, 2017). According to İdin and Aydoğdu (2017), having a good science education in middle school also means having a good high school education at the same time. They think students are not equal in terms of social justice and equal opportunity, and that the opportunities students cannot have are the reasons for dropouts. Educators, who draw attention to how traditional education hinders the education of women in the field of science, indicate that there is a need to address gender inequalities in science education (Hall, 2011). At this point, it is considered that gaining awareness of gender equality has a significant role in closing the mentioned gap in science education.

Conscious and adequate use of current technologies is of great importance in terms of information technologies and software courses in order for the teaching environments to be effective and beneficial. When looked at in the literature, gender inequalities in computer access and usage in school and at home are defined in many studies

(Clegg & Trayhurn, 2000; Durndell, Glissov, & Siann, 1995). In addition, the differences in attitudes and preferences concerning computer applications (Beynon & Mackay, 1993; Colley & Comber, 2003; McKinnon & Nolan, 1990; Mitra, LaFrance, & McCullough, 2001) and gender-based practice and culture areas (Culley, 1993; Ryba & Selby, 1995) were also put forward in a lot of studies. While there are also studies showing that women are disadvantaged both in information technologies education and the workforce (Good, Rattan, & Dweck, 2012), if men continue to be the inventors of what they invented and women are the users of it, it becomes an inevitable reality that women will get weaker and disadvantaged in an age where technology advances. Hence, women need to be more included in the information technology field (Margolis, Fisher, & Miller, 1999; Ryba & Selby, 1995). It was observed when the informational technologies and software course curriculum in Türkiye was examined that there was an expression of "scientist (men of science)" (Karakuş, Mutlu, & Diker Coşkun, 2018). This and similar expressions, including gender bias in curriculum, make negative charges against women. The education area can be a force that can help protect gender equality and provide opportunities for the resolution of change and difference. Therefore, it is thought that integrating and arranging the studies aimed at changing the perceptions of gender equality into the information technologies and software course will be an important step for the studies to be done in this field. Indeed, in research on the online social justice education platform, which includes the use of technology for social justice education, it has been concluded that technology can be used to support education and actions for social justice (Mitchell, 2015). Based on this, it is considered that information technologies and software course can be used as a tool in the teaching of social issues such as social justice and equality.

Based on the results of all these studies, it is concluded that there are a limited number of studies examining the current situation of students regarding gender equality in the context of Türkiye, that students' sensitivity towards gender equality should be improved in these studies, and that arrangements for gender equality should be made in terms of textbooks and curricula. It can be said that it is mostly examined in courses in social areas, that this issue is an interdisciplinary problem and that solutions should be addressed with an interdisciplinary approach, and that studies addressing the current situation regarding gender equality at the middle school level are needed. Based on this, it is thought that it would be useful to examine the current situation regarding gender equality at the middle school level and to take into account the courses in the numerical field in this analysis.

It has been planned to design a middle school curriculum to reduce stereotypes and prejudices among students regarding gender equality and to ensure gender equality in social contexts. Before designing this curriculum, it is required to do a needs analysis as a first step in the curriculum development process. It is planned that this curriculum will be designed to be interdisciplinary and integrate mathematics, science, information technologies and software courses with a gender equality topic. In this context, the questions below tried to be answered through this research:

1. How is the awareness status of middle school students about gender equality?
2. What are the views of mathematics, science, and information technology teachers on gender equality education?

Method

This study is a descriptive research conducted in a qualitative context. The participants of the study consisted of 246 middle school students and nine mathematics, science, and information technologies teachers in Türkiye in the spring semester of the 2017-2018 academic year. Of the participant students, 116 are girls and 130 are boys. 91 of the students are studying in the sixth grade, 75 in the seventh grade, and 80 in the eighth grade. The school where the students study is a public school located in a middle-class socioeconomic region in Adana city. In the research, interviews were also conducted with three mathematics, three science, and three information technology teachers working in different middle schools in Adana.

The awareness of students regarding gender equality was determined by the opinion form structured by the researchers. There are five cases concerning occupations, households, sports, promotion in business life, and education. In each case, first of all, their views on the situation were obtained by choosing one of the options "I find it right," "I am undecided," or "I do not find it right." After answering the multiple-choice item, open-ended questions were included to present the reasons and justifications for the views on the situation. The example cases on this form were presented in the findings part in detail. The questions and case studies in this form were also used in a research conducted by the researchers, which was a continuation of this study (Turhan Türkkan, Arslan Namlı, Karaduman & Karakuş, 2024). Within the analysis of the data gathered by this form, techniques such as frequency determination for multiple-choice questions and deductive analysis for open-ended questions were used. For the participant students, code names such as S1, S2, S3, etc. were used.

Semi-structured interviews with teachers were conducted to reveal the current situation of students' awareness of gender equality and their views towards interdisciplinary gender equality education. In order to set teachers' views, an interview form consisting of eight open-ended questions and six open-ended probe questions was developed by the researchers. In the analysis of this data, the deductive analysis technique was used. For participant teachers, related to mathematics teachers M1, M2, M3, for science teachers S1, S2, S2, and for information technologies teachers I1, I2, I3.

For the reliability and validity of the research, the peer examination technique was used. After one researcher conducted the analysis of the data collected from the students, two researchers analyzed one-third of the data. The analyses of these three researchers were compared. As a result of this comparison, a common decision was reached for situations involving differences. In the analysis of the data collected from the teachers, after one researcher conducted the analysis, another researcher examined the codes and themes. As a result of this review, different opinions were discussed, and a common decision was reached. In addition, examples of direct quotes from participant responses and opinions regarding the credibility of the research were included.

Findings

The findings of the study are presented under two headings, namely, findings on students' awareness and findings on teachers' views.

Findings on Students' Awareness

While presenting students' awareness of gender equality, their responses to the case studies were visualized first, and then the reasons for the responses were classified. The answers given by the students to the first case study are presented in Figure 1.

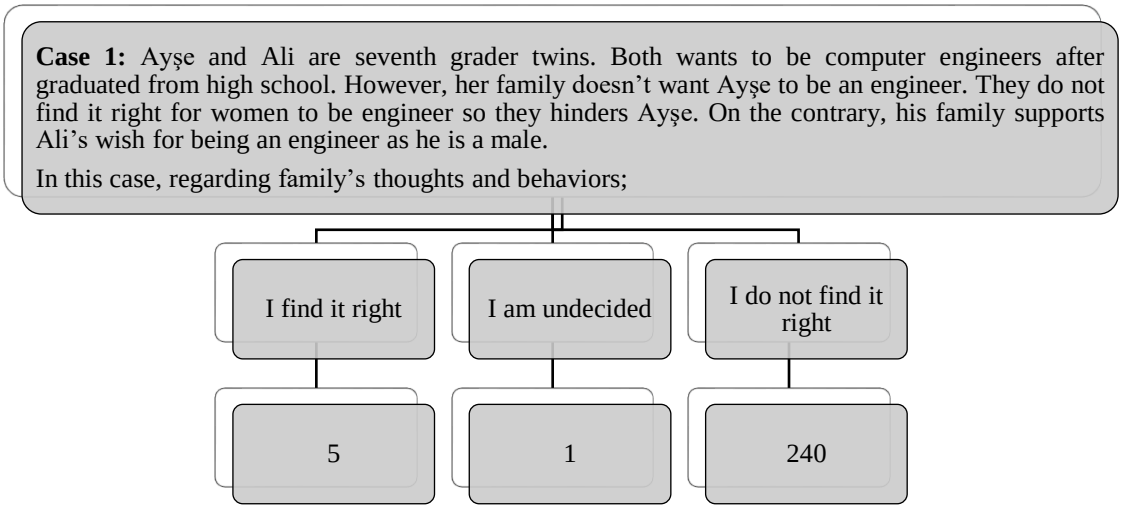

Figure 1. The answers students gave to the first case

As seen in Figure 1, nearly all of the students do not find the situation in this case right. While one student stated that he/she was undecided, five students found the situation right. The reasons given by the students regarding their answers were grouped under two themes: positive reasons and negative reasons. While 205 views were presented regarding gender, 108 views not related to gender were presented in positive aspects. Within the scope of the views on gender, opinions such as disapproving of gender inequality, occupations' having no gender, and the right of women to work were presented. In this line, one student said, *"Because woman and man are equal. It is not right to discriminate about this. Everyone is equal and has equal rights"* (S67, Girl, 6th grade) and indicated that she adopted gender inequality. Regarding non-gender-related views, views such as freedom in choosing the desired occupation, the importance of talent and desire in choosing a profession, and respecting personal choices and decisions. Through the theme of negative aspects, while there were seven views on gender, two views not related to gender were presented. Concerning gender-related views, not finding the right women's work, women's not being successful in engineering, and women's employment in only specific occupations were the views presented. Accordingly, a student said, *"Since I also do not want women to be engineers, who are they to understand computers?"* (S133, Boy, 7th grade), and he put his view on women's not being able to be engineers.

As for the views not related to gender, it is a necessity for parents to choose the profession, not finding it right to choose someone's own profession. The answers given by the students to the second case are presented in Figure 2.

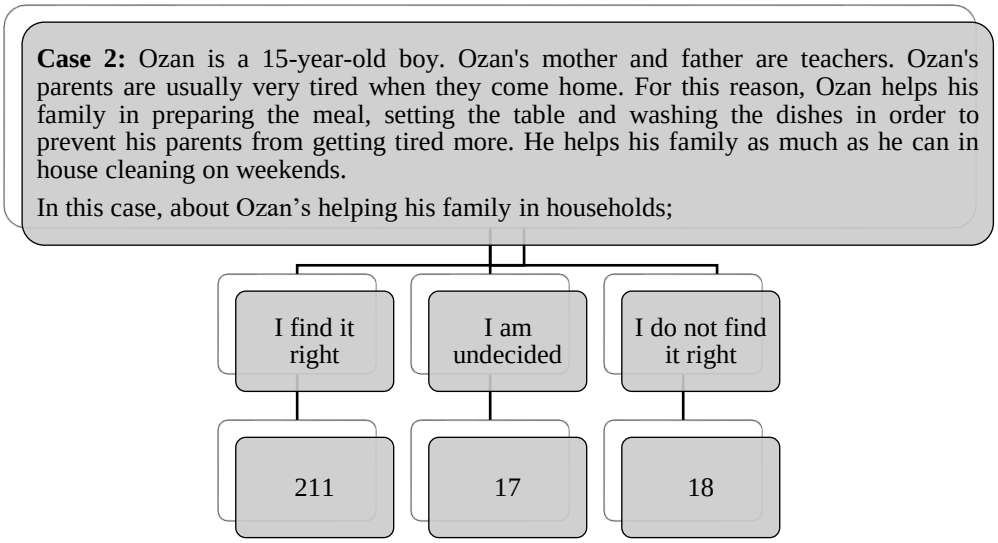

Figure 2. The answers students gave to the second case

As seen in Figure 2, most of the students find the situation in this case right. Whereas 17 students stated that they are undecided, 18 students do not find it right. The reasons students presented for their answers were gathered under two themes: positive and negative aspects. In the positive aspects theme, while 25 views related to gender were put forward, 226 views not related to gender were presented. Through gender-related views, views such as not only women should do the household work but that there is no gender discrimination in helping were presented. For the views not related to gender, sharing households, making the parents happy, and being responsible were indicated. In the theme of negative aspects, six gender-related opinions were presented, while 18 non-gender-related opinions were presented. Concerning gender-related views, households' not being the duty of men and households' being women's duty and serving the father were the opinions stated. Within the views not gender-related, the necessity of caring for homework, not being appropriate for children, and that a housemaid should be hired were indicated.

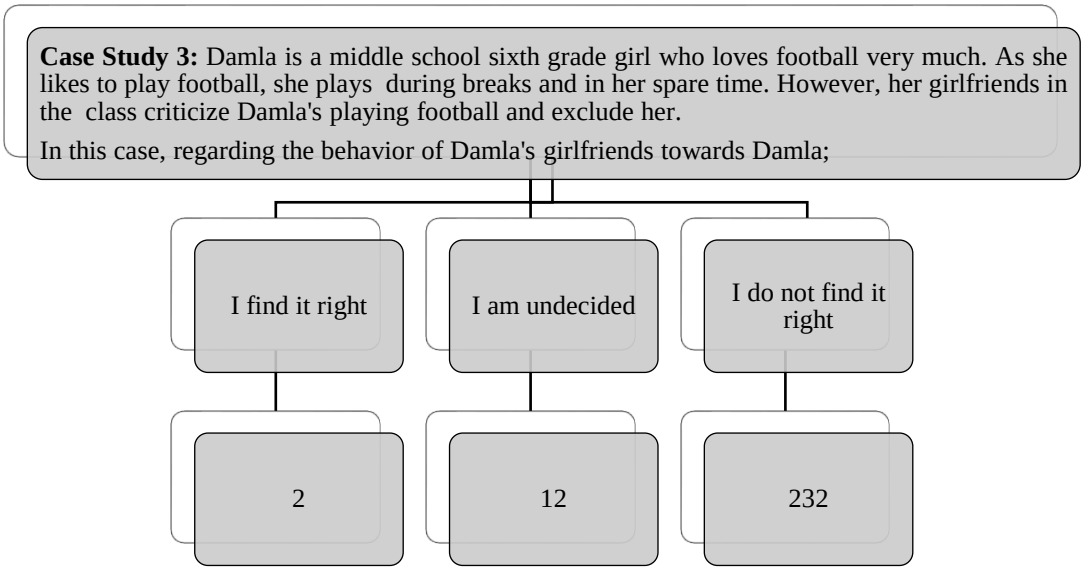

Figure 3. The answers students gave to the third case

It is seen in Figure 3 that most of the students do not find the situation in this case right. As 12 students stated they were undecided, two students found it right. The reasons students put forward were gathered under two themes: positive and negative aspects. In the positive aspects theme, there were 76 views related to gender, while 200 views were revealed as not related to gender. Through gender-related views, everyone's being able to play football regardless of gender, sports' having no gender, and there being gender equality were the views presented. In terms of non-gender-related views, everyone has different interests, showing respect for personal decisions is required, and the freedom to do whatever sport they want was indicated. For the negative aspects theme, there were 11 views related to gender, while one view was non-gender-related. Regarding gender-related views, opinions such as that girls can fall and get hurt, not finding it right for women to play football, and girls' being polite were presented. As for non-gender-related views, the necessity of sparing some time for friends was stated.

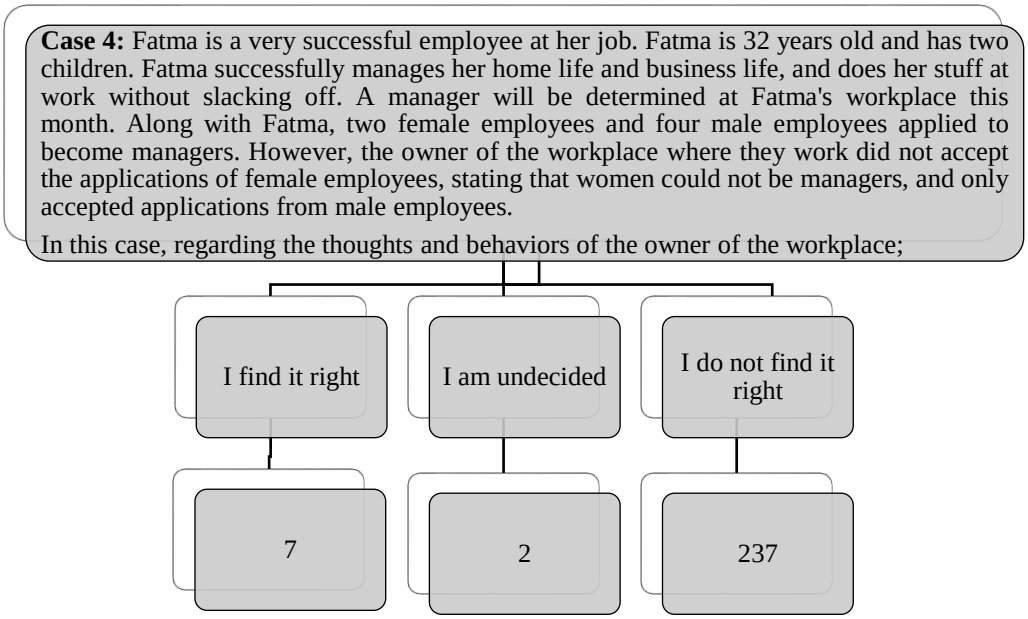

Figure 4. The answers students gave to the fourth case

As shown in Figure 4, the majority of the students do not find the situation in this case right. While two students mentioned that they were undecided, seven students found it right. The reasons put forward by students were situated in two different themes: positive and negative reasons. In the positive views theme, 271 views on gender were presented, while 43 non-gender-related views were shown. In terms of views on gender, views such as the right to promote regardless of gender, the right of women to work, and the necessity of not discriminating against gender were presented. Within the scope of non-gender-related views, opinions such as the need not to be unfair, the need to consider success in the election, and not finding it right to be biased were presented. While 13 gender-related opinions were indicated, not any gender-related views were presented with negative views. Regarding gender-related views, that it's difficult for women to have children, that it's a job only men can do, and that women's being more successful than men were the opinions stated. In this respect, a student said, *"Because women cannot be managers, it destroys us"* (S167, Boy, 6th grade). Another student said, *"Because it's ridiculous, the girl will lead better than the boy; I think it's unfair."* (S7, Girl, 8th Grade), she stated that women would be more successful than men.

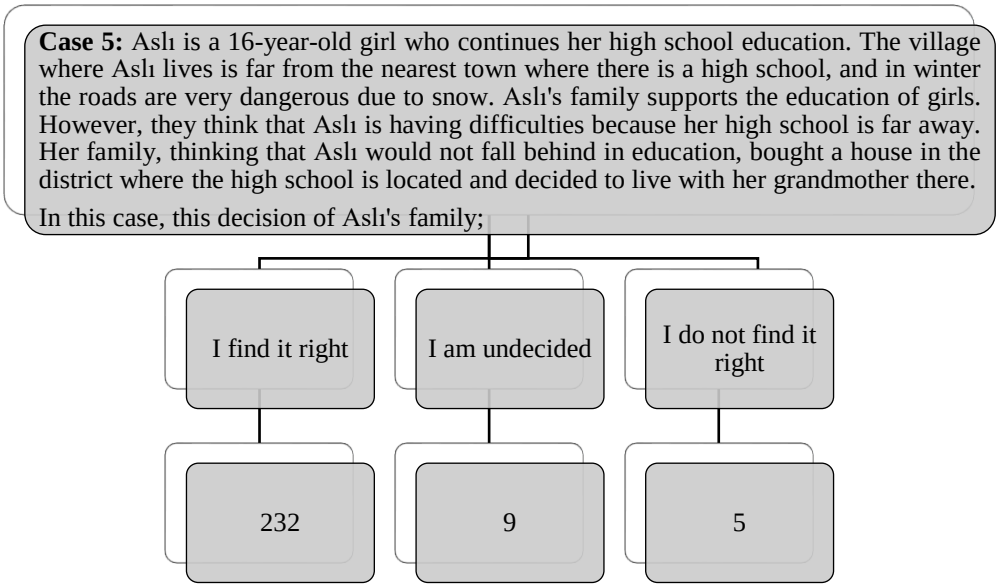

Figure 5. The answers students gave to the fifth case

It is observed in Figure 5; the majority of students find the situation in the case right. While nine students stated that they were undecided, five students found the situation correct. The reasons given by the students regarding their answers were grouped under two themes: positive reasons and negative reasons. Within positive views, there were 71 views related to gender, while 177 non-gender-related views were revealed. Regarding gender-related views, opinions such as the right of girls to education, the necessity of girls' education, and the need to support girls were presented. Within the scope of non-gender-related views, opinions such as considering education as important, having goals and dreams for everyone, and facilitating transportation were presented. In the negative views theme, while one gender-related view was indicated, four non-gender-related opinions were presented. Concerning the views on gender, the view that girls are more successful than boys was presented. Within non-gender-related views, opinions such as the fact that it doesn't matter whether she received education or not because she lives in the village, the necessity of living with her family, and the possibility of wasting the effort were presented.

Findings on Teachers' Views

Teachers' views were collected under nine themes. These themes are as follows: Views on the current situation, experienced situations, activities to raise awareness, solution suggestions, mathematics course and gender equality, science course and gender equality, information technologies course and gender equality, opinions on interdisciplinary gender equality education, opinions regarding gender equality education process. The codes in these themes and sample direct quotations related to the themes are presented below.
When the teachers' views on the current situation regarding gender equality were examined, it was determined that the students do not have awareness of gender equality (f:8), they have false awareness (f:1), and they need education on gender equality (f:8). For this theme, M1 said that *"I think they are not aware of it at all."* M3 said, *"Especially, whatever they get from the family, their family structure is different, the socioeconomic status of their families is different, everything is different. I think it is imperative that there is a curriculum in schools that will accept all differences in this regard and at least an implementation that will show them what this equality is and whether what they have received is wrong or right."* and he/she mentioned that there is a need for education on gender equality.

The teachers presented the situations related to gender inequality under four themes: situations experienced among students, situations related to family and culture, situations related to the school and education process, and situations based on knowledge and practice. When the situations among students were analyzed, it was found that they were exhibiting discriminatory behaviors towards female students, the intimidation of inequality by female students, the violent behaviors of male students, and not playing with friends of the opposite sex. Regarding this theme, S1 said, *"The thing is, male students oppress female students, and girls are used to it."* Among situations related to family and culture, some situations, such as growing up with traditional gender roles and a lack of a role

model, were stated. In the context of situations regarding school and the educational process, states such as behaving according to teachers' gender and giving place to male scientists in textbooks were mentioned. As for situations based on knowledge and practice, situations involving a lack of knowledge regarding the equality concept and supporting equality in theory but not applying it in practice were indicated. Accordingly, S3 stated, *"Now they say there is equality in name, but in practice, there is no such equality in behavior."*

Two teachers stated that they make positive discrimination for female students; three teachers, on the other hand, do nothing in order to develop gender equality awareness. About this theme, M2 stated, *"We don't do any studies as it is a math course."* As for things done for creating awareness, behaving equally while calling students to the blackboard, making opposite sexes sit side by side, talking to and warning the students about the topic, doing group projects, and teachers' being in cooperation were indicated. Concerning this theme, S3 said, *"You're actually going to raise students for a question; let a female student speak, let a male student speak; let it always be equal. In fact, even there, we make a distinction."*

Teachers presented their suggestions regarding ensuring gender equality under two themes: suggestions for education and teaching and suggestions for neighborhoods and society. Teachers made the following suggestions regarding education and teaching: Informing about gender-neutrality of professions, coherence and cooperation of school and family, including gender equality topic in courses, organizing a separate course for gender inequality, including the parents in gender equality activities, observing and empathizing for equality/inequality situations, providing information in guidance course, establishing interdisciplinary relationships, organizing conciliation training, providing information regarding girls' education, including in hidden curriculum, organizing practical educational activities, showing the significance of women in society, focusing on education more than teaching, acting with a scientific approach, destroying false beliefs and introducing woman scientists. Within this theme, I1 said, *"I think families should be informed about this issue first, because the child grows up in the family and unfortunately reflects the same in the classroom environment as he/she sees it in that environment. If there is a conflict between his father or mother, if things that put women in the background or "you are a woman, it is above your head" are instilled, unfortunately, it is very difficult to fix this situation in the school environment because the child sees it directly and applies the same in the school environment, and he does it exactly. We are observing one-to-one"* and suggested being coherent with the family in this. Besides, M3 indicated that a separate course towards gender equality should be organized by saying, *"To change this, to teach the truth of it, a course could be put on; a course with no grade value could be added. We had uttered this in a meeting; even in my former school, this problem was also there. I think a course with no grade, just like an elective course, there should be an education to tell about, to convey this or show it in behaviors."* In the context of suggestions for the living environment and society, the necessity of producing family-oriented solutions, having role models in the neighborhood, arranging television messages, and providing solutions at the social level was mentioned.

The views of mathematics teachers regarding mathematics courses and gender equality topics were presented under three themes: current situation, practicality, and problems. In relation to the current situation, two of the three mathematics teachers said that they do not associate the course with the topic of gender equality, while one teacher mentioned the presence of association in the course. Within the problems concerning gender equality, not presenting female mathematicians and thinking that the developers of mathematicians are male and mathematics teachers are not included in social-themed activities were mentioned. Regarding the applicability of associating the gender equality subject with the mathematics course, the teachers mentioned that the gender equality subject could be included in the problems, that it could be associated with the mathematics course, that it could be included in the set topic, and that it could be included in the data processing unit. On this theme, M2 indicated that the gender equality topic could be included in mathematics problems, saying, *"Within questions, for example, in problem situations, messages that indicate equality between men and women can be given. For example, we posed a problem. We read the problem and skipped it. When we include this subject in the problem, that information may remain in your mind. While solving the problem, we are placing that information in the brain; that is, we are placing it in the subconscious."*

Science teachers' opinions on science course and gender equality topics were put forward within three themes: the current situation, applicability, and problems. Teachers stated that they included gender equality topics in problems, included visuals related to women, mentioned differences, and gave project assignments against traditional gender roles within the current situation. In addition, one teacher indicated that it is difficult to associate with the science course and does not link the course with gender equality. Regarding this theme, S1 said, *"For example, we give project assignments to students; boys always want to do something about electricity, girls always want to write. I gave the girls projects about electrical circuits this year, and I said design a flashlight; I said design a caravan; a caravan is something that is always given to men; car design or something; I gave it to a female student, and she did it very well."* and mentioned that he/she gave assignments against traditional gender

roles. Through problems regarding gender equality, they indicated a lack of emphasizing the reproduction topic sufficiently and a change in curriculum and content too often. On the applicability of associating science course with gender equality topics, teachers stated that it could be included in puberty and secondary sex roles topics; it could be associated with DNA, with blood types, with reproduction in humans; it could be taught by hidden curriculum and in an interdisciplinary approach. Concerning this theme, S1 said, *"Because it is convenient, it is something that appeals to science and social field as well. The courses in social fields are not restricted to the social sciences; they could be taught to students in science course under the name of hidden curriculum."*

Information technologies teachers' views on information technologies and software courses and gender equality are presented under two themes: current situation and applicability. In the current situation, three teachers stated that they do not associate information technologies and software courses with gender equality. On the other hand, one teacher asserted that it is not situated in the curriculum. Regarding this theme, I2 stated that information technologies and software courses could not be associated with gender equality by saying, *"As this course is primarily computing literacy, also programming and algorithms, that is, it is not such a course, not a social course."* As for the applicability of associating information technologies and software courses with gender equality, teachers indicated that it could be linked with digital citizenship, with social media, with cyberbullying, there could be research on gender equality, visual design, and projects, it could be associated with computing ethics, with entrance to computing, and example videos could be watched related to gender. I1 said that it could be related to digital citizenship, saying, *"As I already said, I think it is all associated with the digital citizenship subject."*

Teachers' opinions on interdisciplinary gender equality education were gathered under two themes: positive and negative opinions. Accordingly, while eight teachers thought that it could be effective, one teacher expressed concern about its applicability. Related to this theme, I1 put forward the anxiety for the situation in the words, *"The framework plan is apparent; I have concerns about how it would be to include it in numerically weighted courses as social subjects are verbally weighted subjects."* Regarding positive opinions, it is stated that awareness towards gender discrimination could be gained, academic achievement could be increased, awareness regarding female students could be raised, affective features could be gained, it shows similarity with the STEM approach, and numerical courses could be approached from different perspectives. As for negative and abstaining opinions, views were presented that it is difficult to associate with the mathematics course, and a social studies course could also be included. Concerning this theme, I3 indicated the possible benefits of such an application, saying, *"I think that mathematics success will increase as well. Because the subjects do not attract attention, the success is always low; in this way, maybe they can attract the attention of the students."*

When teachers' opinions regarding the gender equality education process were examined, two teachers expressed their views on ensuring continuity, five teachers on the possibility of its inclusion in the fifth-sixth grade, and three teachers on the possibility of its inclusion in the seventh-eighth grade. For this theme, M1 said, *"The younger we start to gain, the more effective and successful we become. If you say middle school, it should start in the fifth grade. Since fifth graders are so innocent. Minds work terribly in eighth grade. Because their hormones absorb them. There is nothing to do. The child cannot cope with hormones. Maybe then the subject could hang in the air. The student who gets it gets it again, or the person who gets it does it again. But the younger it is given, the better."* Besides, S2 expressed her/his views as follows: *"I think that this distinction can be misunderstood for children in the fifth and sixth grades in junior grades. So in the seventh and eighth grades, it can be sprinkled at the end, the beginning, the middle, somewhere in a suitable unit."*

Conclusion and Discussion

When the findings regarding the awareness of gender equality among the students were examined, it was determined that they presented generally positive opinions about the example cases. It could be inferred that nearly all of the students do not have discriminatory views through the case of gender equality in terms of occupations. On the other hand, while the majority of students' reasons are related to gender, it is also seen that there are also many opinions that are not related to gender. Starting from this, it could be said that some of the students in the first case realized the gender inequality, while others could not. It could be indicated that most students did not have discriminatory views in the case regarding gender equality in households. However, while students present their reasons for these opinions, it is seen that they mostly put forward non-gender-related reasons. Based on this, it can be said that in the second case, the majority of the students did not address the situation in terms of gender equality. In the case regarding gender equality in terms of sports, it could be said that the majority of students did not have discriminatory opinions. Yet, it was seen that while students presented the reasons for their views, they

mostly put forward reasons that were not gender-related. In addition, it was also determined that students presented many reasons about gender as well. Starting from here, it could be indicated that most of the students could not realize the gender inequality; some could realize it in the third case. In the case of promotion in a profession, it could be asserted that the majority of students did not have discriminatory opinions. It was seen that most reasons among students were associated with gender, and there were also opinions not related to gender. Apart from this, it could be said that most students realized the gender inequalities while some did not in the fourth case. In the case of gender equality in education, it can be said that the majority of the students did not have discriminatory views. However, students usually give non-gender-related reasons for their views while also presenting gender-related views. Based on these results, it can be said that the majority of the students do not have discriminatory views in terms of gender. When the negative reasons for the case studies were examined, it was determined that the views on gender inequality related to professional promotion were the most common. Compared to other dimensions, it can be said that they mostly have gender stereotypes about professional promotion. Besides, there were also opinions about gender inequality within sports, professions, and households. In a similar study by Yolcu and Sarı (2018) with fourth graders, it was determined that students had gender stereotypes towards professions and households. However, it was observed that the majority of the reasons presented for the cases on girls' education were put forward in a way that was not related to gender. Based on these views, it was observed that the students generally did not have discriminatory views in terms of gender, but they did not handle most of the situations in the cases in terms of gender. In addition, it has been determined that some students, even a small number, have discriminatory views in terms of gender. As a result of the research based on the data obtained from the students, it can be said that the opinions expressed by the students in the case studies are generally positive, but they do not look at it from the perspective of gender equality when explaining the reasons for their opinions. This indicates that students cannot notice the situation of gender inequality in the case studies. According to teachers' views, students' awareness of gender equality is not sufficient. In similar studies conducted on this subject, it has been determined that students have deficiencies in gender equality (Acar Erdol & Gözütok, 2017; Bağçeli Kahraman & Başal, 2011; Kalaycı & Hayırsever, 2014; Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014; Yeşil & Balcı Karaboğa, 2021; Yolcu, 2021; Yolcu & Sarı, 2018). In line with these results, it is considered necessary to develop the awareness of gender equality among students.

With respect to teachers' opinions, it was found out that students have no awareness of gender equality and need education regarding this. Besides, it was observed that there were cases of discrimination, especially among students. For example, situations such as aggression towards female students, intimidated behaviors of female students, the tendency of male students to violence, girls and boys not playing together, and grouping between genders are remarkable. Since these behaviors are related to discrimination, it is also remarkable that teachers are behaved according to their gender in school. Lastly, it is also remarkable that students are raised with traditional gender roles in families; girls do household chores while no responsibility is given to boys within the family. Based on this, it can be said that one of the sources of unequal situations at school is the family. In a study in Türkiye, it was found that gender inequality and inequality regarding disabled people were the problems most experienced in schools (Turhan Türkkan, Yolcu, & Karataş, 2017). In this context, it is stated that there are gender-based problems in schools (Trinidad, 2020). Gender equality in education is identified as a problem in Türkiye and in order to analyze and design the education of girls in Türkiye, a rich feminist environment is required (Cin & Walker, 2016). In addition to this situation, it has been determined that teachers do very superficial activities for gender equality in schools, such as treating students equally in calling them to speak, and seating girls and boys side by side. From this, it can be said that teachers do not make adequate and effective practices in this regard. With respect to this, it may be effective to get the opinions of teachers in terms of gender equality. In this research, teachers were asked about the current situation regarding gender equality, but their views on gender equality were not asked. Studies carried out in this context were generally regarding pre-service teachers. In these studies, it was determined that pre-service teachers lack knowledge in terms of gender equality; they have stereotypes and traditional gender perceptions in terms of gender (Acar Erdol, 2019; Acar Erdol, Özen & Toraman, 2019; Aslan, 2015; Aydemir, 2019; Koyuncu Şahin, Esen Çoban & Korkmaz, 2018). Accordingly, in addition to this research, teachers' perceptions of gender equality should be revealed. It is an ordinary state that a teacher does not adopt gender equality to not notice the problems through this subject and act for solutions. Besides, the teachers in this research generally put forward diverse solutions and suggestions for gender equality problems. Teachers made solution suggestions regarding education in order to create awareness for gender equality and also brought various suggestions related to the living environment and society. In this sense, the gender neutrality of professions, including the subject of gender equality in lessons, making interdisciplinary connections, organizing it as a separate course, and hidden curriculum activities, are suggestions that could be applied and be effective. In addition, recommendations such as producing family-oriented solutions and including families in activities for gender equality are also suggestions that could be effective for including the neighborhood in this process as well. It has been determined that educational practices towards gender equality reduce prejudice, stereotyping, and discriminatory views on gender and create positive outcomes in terms of gender equality (Acar Erdol, 2019;

Aydemir, 2019; Brinkman, 2009; Esen, 2013b; Kollmayer, Schultes, Lüftenegger, Finsterwald, Spiel & Schober, 2020; Özcan, 2012; Seçgin & Kurnaz, 2015; Şener Özel, 2019; Yeşil & Balcı Karaboğa, 2021; Uzun, Erdem, Güç, Şafak Uzun & Erdem, 2017; Yolcu, 2021). These studies, on the other hand, have been developed much more as a separate course or practice regarding gender equality or conducted in association with social field courses such as social studies and life sciences. In this respect, it can be said that no practice has been made to associate the subject of gender equality with the courses in the field of numeracy. The fact that many real-life problems are multifaceted and that the causes and affecting factors of real-life problems are related to more than one field shows that real-life problems are interdisciplinary (Menken & Keestra, 2016). Problems related to gender equality are also real-life problems, and therefore it is thought that addressing them in an interdisciplinary context will make significant contributions. In this research, it has been concluded that gender equality subjects can be integrated with various topics in mathematics, science, information technologies and software courses. More positive views were presented on interdisciplinary gender equality education, and interdisciplinary gender equality education can be given mostly in the fifth and sixth grades. Based on these results, it could be said that there is a need for education regarding gender equality, and it is appropriate to integrate this education with science, mathematics, information technologies and software courses. The data obtained from students in this research is limited to only one school, and the research is limited to Adana province only. For this reason, it is thought that it would be useful to examine the research in different and broader contexts.

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Ethical Approval

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English as a Foreign Language Teachers' Technology Professional Development Needs

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Abstract
This study examined the Technological, Pedagogical, and Content Knowledge (TPACK) professional development needs of English as a Foreign Language (EFL) Teachers. EFL teachers participated in semi-structured interviews from seven primary schools in a middle-sized urban school district in the east part of China. Content analysis with frequency tables and quotations from the interview transcription were conducted. The results indicated that though primary EFL teachers in China have the basic technological knowledge to support teaching, they lack appropriate knowledge and training particularly in areas of TPACK related to EFL teaching. Results from the present study indicate that there is a need for professional development (PD) that helps EFL teachers integrate technology in teaching reading, speaking, and writing.

Keywords: EFL, TPACK, Teacher professional development, Education technology

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Introduction

Multimedia instruction using resources from the internet and multiple types of videos and audio-assisted listening experience has been found to boost students' language acquisition (Levak & Son, 2017; Tingir, et al., 2017). In addition, technology provides students with the motivation to acquire new concepts, both in content-area learning, as well as primary language and second language development (González-Carriedo, & Esprívalo Harrell, 2018).

Similarly, the ability of EFL teachers to integrate technology into their teaching plays a critical role in their students' language development (Rienties, et al., 2020). The use of digital learning has widely spread among English language learners (ELLs) by providing opportunities for interacting with peers and teachers, as well as for searching for vocabulary words and other resources (Park & Slater, 2015). Using educational and informational technology in EFL teaching and learning affords rich interactive tools and exciting materials to improve teaching effectiveness (Sadikin, & Saleh, 2016).

The Ministry of Education of China in 2018 implemented the National Education Informatization 2.0 Action Plan (NEIAP 2.0). This action plan focused on developing and promoting the training of informational technology application skills for K-12 school teachers across the country. This plan aimed at building a classroom-based, application-driven, and innovation-oriented teachers' educational technology literacy growth by 2022 (Educational informatization 2.0, 2018). To achieve this goal, there are essential needs that need to be considered such as implementing teacher training in technology use, narrowing the gap between urban and rural teachers' ability to use technology in their teaching, and building an informational technology-based teaching innovation for leading the future education (Educational informatization 2.0, 2018).

Although this policy has been implemented, there is little evidence that indicates that EFL teachers in China are receiving sufficient professional development (PD) training in integrating technology in their EFL classes (Xu & Sun, 2019). More importantly, due to the pandemic of the COVID-19, teaching virtually or in a hybrid format (online and face to face context) technology integration is becoming more important than ever. It is critical for schools to understand that it is not enough to increase teachers' access to hardware, but there is a need to develop teachers' ability in the how to use technology specific to the disciplines that they teach. The purpose of the present study was to examine primary school EFL teachers in China Technological, Pedagogical and Content Knowledge (TPACK) (Mishra, & Koehler, 2006), as well as, their perceived PD needs related to technology for teaching EFL.

Conceptual Framework: TPACK

Lambert et al. (2008) defined "technology integration" as "teachers utilizing content and technological and pedagogical expertise effectively for the benefit of students' learning" (p. 386). In addition, Mishra and Koehler (2006) have indicated that the knowledge that teachers need to make choices regarding the prospective use of technology in educational contexts includes Technological Pedagogical Content Knowledge. This theory addresses teachers' capability to incorporate technology into the curriculum (Bostancıoğlu & Handley, 2018).

The TPACK model considers the interaction between three domains of knowledge: content, pedagogy, and technology. The framework for TPACK contains seven categories of knowledge supplementary with the integration of technology in instruction (Baser, Kopcha, & Ozden, 2015). First, Pedagogical Knowledge (PK) refers to teachers' profound knowledge about the procedures and performance or techniques of teaching and learning (Koehler et al., 2013). Second, Content Knowledge (CK) refers to teachers' knowledge of the subject area. Third, Pedagogical Content Knowledge (PCK) addresses teacher's CK for teaching (Bostancıoğlu & Handley, 2018). Fourth, Bostancıoğlu and Handley (2018) concluded that Technological Knowledge (TK) refers to "teachers' understanding of how to operate technologies which could be used in education" (p. 575). Thus, Technological Content Knowledge (TCK) addresses the knowledge needed to be able to use technology so that subject matter can be presented to promote understanding. Additionally, Technological Pedagogical Knowledge (TPK) focuses on how the use of the technology can improve teaching and learning. TPACK is the interception of TPK, TCK, and PCK (Figure 1).

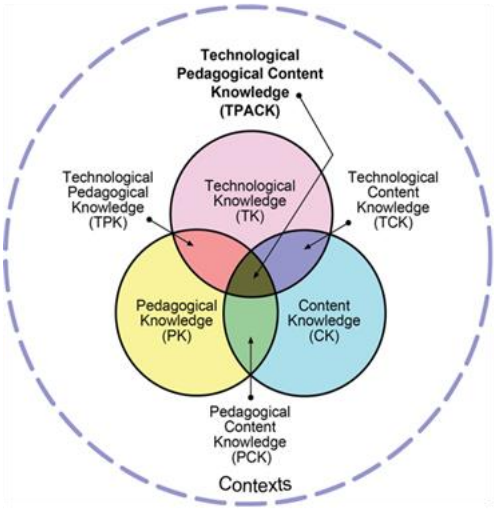

Figure 1. The TPACK image (Reproduced by permission of the publisher, © 2012 by tpack.org)

TPACK in EFL

Using of educational technology to improve teaching practices for learning through the lens of TPACK is valuable (Goradia, 2018). Recent studies, however, have shown that teachers' instruction is still restrained by conventional teaching strategies and focused on evaluating student performance influenced by the exam-driven curriculum (Liu & Kleinsasser, 2015). Many EFL teachers, for example, lack TK, which can assist them in incorporating technology in their teaching (Yıldız, 2017; Nazari et al., 2019). Alnajjar and Al-Jamal (2019) conducted a TPACK study which surveyed 69 EFL teachers in Jordan and found that teachers were lacking TK. That is, there was a disconnection between CK and TK, and TPACK. A similar study, conducted in Taiwan, also reported, among the seven TPACK components, EFL teachers' TK to be their most limited area, which indicates, EFL teachers need more TK to further strengthen their TPACK (Wu & Wang, 2015). A more recent study conducted in mainland China also demonstrated that EFL teachers self-reported more confidently with TK but relatively uncertainly with their knowledge in TCK, TPK-TPACK (Li, 2021).

Moreover, studies have found that although EFL teachers indicated that they had confidence in CK, they do not feel that they have the TPK in the subject area that they are teaching (Sulaimani et al., 2017; Xu & Sun, 2019). According to Köse (2016) who administered a TPACK-EFL Survey to 127 EFL teachers in Turkey, the English teachers believed the most important component was their CK; yet "they do not think that they are highly competent in integrating technology into their content teaching with sound pedagogy" (p. 17). In a similar study, Hsu (2016) found that participants possessed appropriate TK, however, there was of lacked understanding found in three core areas: TK, PK, and CK. Hence, it appears that the effective use of technology requires a thorough comprehension of PK and TK, as well as, an understanding of how they interact with CK in order to deliver valuable instruction (Debbagh & Jones, 2018).

Additionally, studies have also found that the EFL teachers displayed a lack of ability in manipulating technology in class with appropriate pedagogies and they expressed a need to be provided with relevant PD activities regarding TPACK as it related to EFL (Liu et al., 2014; Nazari et al., 2019; Zhou, Padron, & Waxman, 2021). It is important that teachers receive appropriate PD since teachers' knowledge and attitudes toward teaching via technology. Their ability to use technology and the challenges they face during teaching have been identified as impediments to technology integration. (Liu et al., 2014).

Little research, however, has examined whether EFL teachers in China receive sufficient PD training in TPACK. In addition, most of the studies in literature do not address the integration of technology specifically in the subject of teaching EFL. Given the expected effects of policy implementation in China and the benefits of educational technology reported in many studies, it is vital to explore the how EFL teaching use of technology. Three research questions were addressed as follows:

1. What are Chinese EFL teachers' perceptions of their use of TPACK?
2. What are Chinese EFL teachers' attitudes of their use TPACK and the support that they receive in teaching digitally?
3. What are Chinese EFL teachers' perceived PD opportunities and PD training needs regarding TPACK?

Method

Instrument

A semi-structured interview protocol consisting of 20 main questions along with follow-up probing questions were used in this study. Items of the interview protocol were adopted from Zhou et al. (2022) and adapted from two instruments: a) the Technological Pedagogical Content Knowledge (TPACK) for English as a Foreign Language (EFL) (Bostancıoğlu & Handley, 2018) and b) the EFL teachers' Current Practice and Application of EEFL (CPA-EEFL) (Kabakci Yurkakul et al., 2012). Both EFL-TPACK and CPA-E-EFL are comprehensive self-reporting instruments that focus on the identifying TPACK for the teaching of English language and teachers' perceptions of TPACK and its related training. The two instruments use a five-point Likert type scale ranging from 1= 'strongly disagree' to 5= 'strongly agree'. EFL- TPACK is made of 36 items which have good internal reliability reported with an overall Cronbach's α coefficient at .94 (Bostancıoğlu & Handley, 2018). Likewise, CPA-EEFL contains of 33 items with the internal consistency values of α = .95 (Kabakci Yurdakul et al., 2012).

The interview of the present study intended to gauge teachers' knowledge and attitudes toward the integration of technology into teaching EFL and their related PD needs (Table 1). More specifically, the interview aimed at examining primary EFL teachers' knowledge about: a) use of technology, b) technological and pedagogical teaching skills, c) integration of technological, pedagogical and content knowledge in EFL teaching; d) teachers' attitudes towards applying TPACK in EFL teaching, and e) teachers' PD training opportunities and needs related to TPACK.

Table 1. Sample questions of the interview

Category	Example
Technology use	What kind of computer hardware do you usually use in the classroom?
Technological & pedagogical skills	How do you digital tools in teaching?
Technological, pedagogical & content integration in EFL class	What educational technology tools do you use when teacing students in the skills of listening, reading, writing and speaking?
Teachers' attitudes towards applying TPACK	Are you satisfied with educational technology use in your current teaching context?
Teachers' TPACK related PD training opportunities and needs	Have you had sufficient PD focusing on using technology in teaching EFL? If not, why?

Data Collection & Data Analysis

Each participant was interviewed for approximately 30 minutes in English. The audio part of all interviews was recorded and later transcribed by the authors. The original instrument has been proved with good validity as it has been applied in Bostancıoğlu & Handley (2018), Kabakci Yurkakul et al. (2012), and Zhou et al., (2022), respectively. Due to the descriptive nature of the interview modality, content analysis with frequency tables, figures, and quotations from the interview transcription were used. In terms of the frequency tables and figures, descriptive analysis of quantitative coding results from the interviews were conducted. In assessing teacher's TPACK, responses to each question were coded as *No* equals to 0, and *Yes* equals to 1. In addition, questions regarding teacher's judgments and attitudes were coded as: positive judgments and attitudes were coded as *Yes= 1*, and the negative responses were coded as *No= 0*. Lastly, for questions that examine teacher's feeling or perception by different levels, responses were coded according to participants answers numerically from Disagree= 1 and up to Agree= 4 to represent the level in categories.

Sample

After receiving institutional review board approval, the authors used the institution's bulk email to recruit participants from local school district in an suburban area in east China. With random sampling, 60 EFL teachers from seven public primary schools were recruited. Teachers who agreed to participate in this research study were further communicated with in-person semi-structured interviews. Generally, the participating EFL teachers involved in this study served approximately a total of 8, 000 EFLs. Due to China's large population, particularly in the eastern region, the size of class in this public-school district is large with an average of 50-60 students per teacher. Generally, each EFL teacher has a teaching load of two to four 45-minute class periods a day.

The participants (N=60) in this study included 49 females (82%) and 11 males (18%) EFL certified full-time teachers ranging from third to sixth grade level. The mean of the participated EFL teachers' age was 39 years old with a median at 35. According to Table 2, most teachers' ages range from 31 to 50 years old. The average year of participants 'teaching experience was 11 years, with a median at 9 years. Twenty-three percent of teachers were at beginning level with less than 5 years teaching experience, 33% of teachers were at intermediate level with teaching experience between 6 and 10 years, 22% of participants had advanced teaching experience with 11 to 15 years, and 22% of participants had advanced high level with teaching experience of 16 years and more.

Table 2. Characteristics of Participants (N= 60)

Characteristics	Category	Frequency	%
Gender	Female	49	82
	Male	11	18
Age (Mean= 39)	20-30	9	15
	31-40	24	40
	41-50	16	27
	51+	11	18
Years of experience (Mean= 11)	0-5 (beginning)	14	23
	6-10 (Intermediate)	20	33
	11-15 (Advanced)	13	22
	16+ (Advanced high)	13	22

Results

Teachers' perceptions of their TK, TPK, and TPACK

EFL Teachers' TK

To determine the EFL teachers' TK, EFL teachers were asked: "What kind of computer hardware do you usually use in the classroom? And why do you prefer to use these tools?" Teachers responded that the hardware that they most often used in the classroom included (Figure 2): computer/laptop (80%), Office software (78%), and e-Textbook (69%). Teachers reported that these tools were time-saving and easy to operate in class to engage students. Results related to the participants' perceptions of their ability to use digital tools and their knowledge of technology related concepts indicate that 97% of teachers have sought help from online platforms and/or peers to solve technological problems. For example, 50% of the teachers did not know how to edit images or edit videos.

Interestingly, nearly 40% of teachers reported that they have chat groups on mobile "Apps" with parents. They found this is effective in involving parents in their children's language learning. In general, teachers know how to use technology at a basic level, such as computers, office software, and e-textbook; however, the results also indicate that they lack TK when it comes to being able to solve technical problems independently.

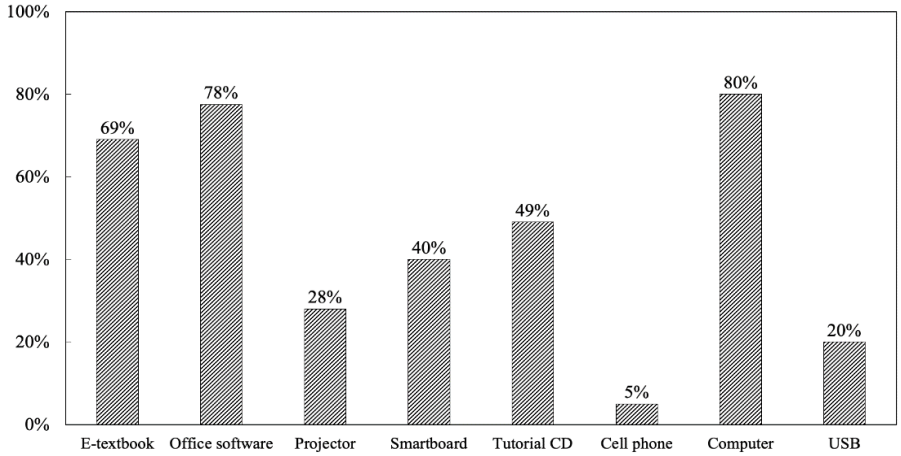

Figure 2. Percentage of teacher' who use specific soft/ hard-ware

EFL Teachers' TPK

Teachers were also asked about how they used digital tools in teaching. Among the technology tools used for whole group instruction, the use of audio and video files within the e-textbook and tutorial CD were mentioned most often (73%). This was followed by, the use of PPT to share the content and key concepts from the book (60%). Teachers reported the use of smartboard and the accessing online platforms and internal links to interact with students, (41%, 40% respectively). Few teachers (16%) mentioned that some schools have smart classrooms that provide students with digital tools that they can use in class to interact with teachers and/or peers, such as iPads; yet, teachers are able to teach in this classroom once per semester due to the lack of availability of the classroom (Figure 3).

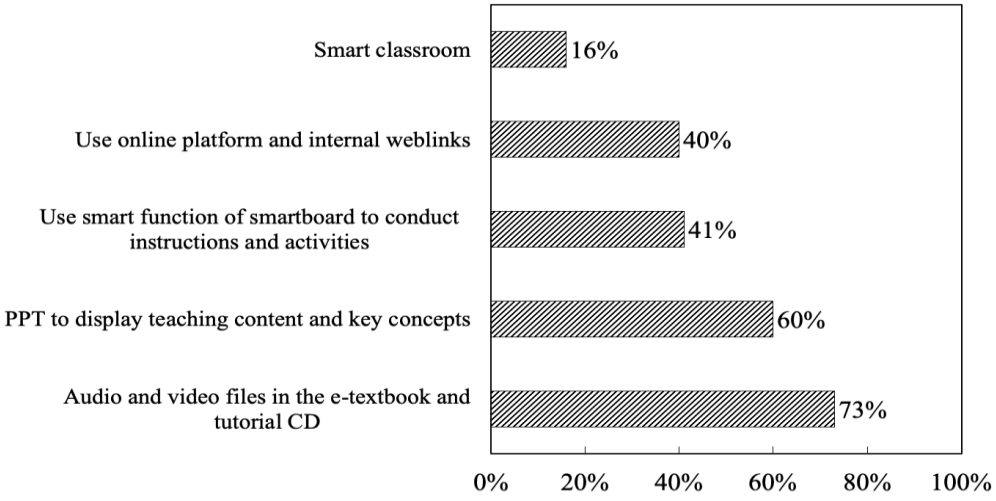

Figure 3. Percentage of time that a specific technology is used in teaching EFL.

Although 41% of the teachers reported using the Smartboard and this is required practice for all teachers by the Ministry of Education in China in NEIAP 2.0, a small percentage (13 %) of the teachers perceived themselves as skilled in using the smart functions of the whiteboard (Table 3). Not surprisingly, in terms of the features of educational technology that teachers used in engaging students, only 25% of teachers have applied a combination of visual, audio, and translation features. On the other hand, 75% of the teachers sought online materials for use in their lesson plans, while 50% used resources provided by the school district. However, only 40% of the teachers indicated that they knew English learning websites for preparing lessons and for students to use. Interestingly, teachers (63%) were unable to define multimedia instruction. Teachers gave a few examples in a tentative tone, such as "PPT?", "audio recording?", etc.; one teacher asked: "Is it just teaching with computer?"; another teacher said, "is it like to use a projector in teaching?"

Table 3. Percentage of teachers' having technological pedagogical knowledge

TPK	Frequency	%
Know the smart function of the whiteboard	8	13
Able to clearly define Multimedia Instruction	38	63
Use multiple types of technology in teaching	27	47
Use combination features of technology in teaching	15	25
Sufficient knowledge of English learning websites	24	40
Get multimedia resources online	45	75
Get multimedia resources from school district	30	50
Know the smart function of the whiteboard	8	13

Note. N= 60

EFL Teachers' TPACK

Regarding what educational technology tools teachers use when teaching students in the skills of listening, reading, writing and speaking, 95% of teachers reported using technology to practice listening skills; while, 60% used technology in teaching reading development and 57% of used technology in teaching speaking skills. Only about a third of the teachers used technology to assess students (33%) or develop students' writing skills (32%).

Among those who use technology in teaching the four language skills (Figure 4), the activities used most often to develop oral language skills included dubbing and voice recording for role-playing (38%) and story retelling (18%). In addition, digital picture books (47%), video and audio aids (23%), and e-dictionary (16%) are used to facilitate students' reading skills. For writing instruction, displaying sentence structures on the smartboard (15%) and providing word banks (33%) occurred most often in teaching. Additionally, nearly 67% of the teachers indicated that they do not assess students using digital tools.

In general, EFL teachers in this study are integrating TPACK in teaching the listening aspect of language. For example, the majority of teachers used audio and video files which provide authentic native speakers' voice for students to practice listening skills. However, they integrated TPACK less often in developing students' speaking, reading, and writing skills.

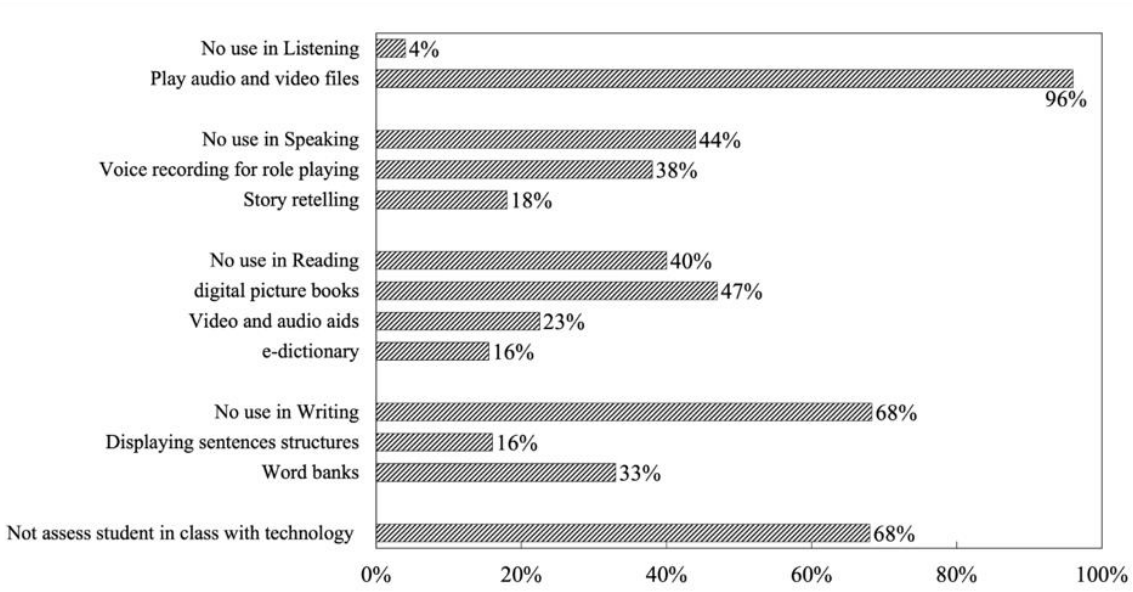

Figure 4. Percentage of teachers using a particular technology in teaching the four language skills

Teachers' Attitudes Towards Their TPACK Support

As for teachers' satisfaction with educational technology use in their current teaching context, only 30% of the teachers felt satisfied while 42% indicated that they were familiar with the support provided by the school district (Table 4). Interestingly, 53% of the teachers reported that observing a master teacher is an effective way to learn technology skills in teaching EFLs. Overall, teachers (87%) have positive perceptions about teaching EFL digitally, however, they are not satisfied with the use of educational technology in their teaching and the resources given by the school district.

Although the majority (87%) of teachers reported a preference for teaching digitally (Table 4), teachers most often reported difficulties in teaching digitally were: the lack quality resources (67%) and their lack of technical skills (58%) (Figure 5). In addition, 53% of teachers felt that it was hard to engage students in teaching writing. Interestingly, 21% of the teachers indicated that they did not have many difficulties using technology in their teaching since they seldom used technology to teach.

Table 4. Percentage of EFL teachers' perceptions towards TPACK support

TPACK	Frequency	%
Satisfied with school and district's support	18	30
Familiar with school district's technological support	25	42

Preference for teaching digitally	52	87
Observing master teacher's teaching and gaining advice from them	32	53

Note. N= 60

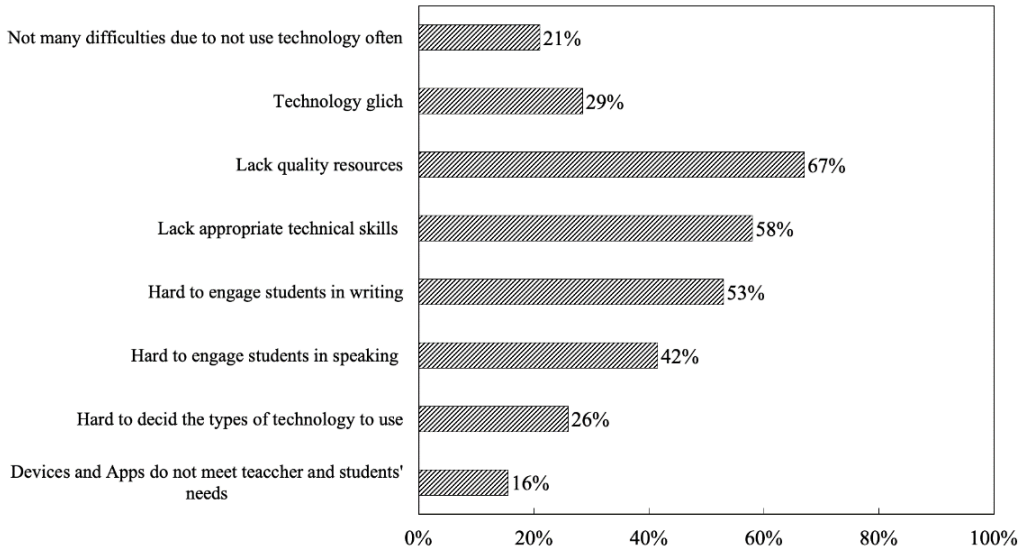

Figure 5. Percentage of teachers indicating the reasons for difficulties in teaching with technology

EFL Teachers' PD Opportunities and Needs

A few (22%) teachers perceived having received sufficient PD related to teaching digitally. In the past two years, 47% of teachers reported having had online PD, and 53% had face to face PD training (Table 5). Overall, most teachers (93%) indicated that the lack of use of technology in their EFL class was due to the lack of training in this area.

Table 5. Percentage of EFL teachers having PD opportunities

TPACK	Frequency	%
Soft/hard-ware PD opportunities	35	58
ICT PD opportunities	22	37
Online PD opportunities	28	47
Face to Face PD opportunities	32	53
Perceived had sufficient PD	13	22
Need more TPACK relevant PD opportunities	56	93
Soft/hard-ware PD opportunities	35	58

Note. N= 60

Not only was the PD not offered, but they (47%) did not know how to obtain information on the availability of that training. Teachers (59%) further explained that much of the PD they have received did not meet their needs, since it did not focus on teaching EFL; it was only for the purpose of accumulating credits. Additionally, teachers indicated that they had had no PD training that provided them with quality teaching resources (Figure 6).

Results from this study indicate that teachers did not have sufficient PDs in TPACK-EFL. The majority of the teachers (93%) indicated that they needed PD focusing on using technology in teaching EFL. Additionally, 57% of teachers said they prefer to have both more PD training and more support resources. Moreover, 35% of teachers prefer to have online/distance PD training, 42% like in-person PD more, while 23% would accept both (Figure 7).

Teachers who preferred to have online PD explained that online PD was preferred because of the flexibility by not requiring attendees to physically stay in a certain place and attend at a particular time. Also, online PD allows teachers to go back and review concepts easily. One teacher said, "I feel like online PD is more flexible to control the time and mobility, and it is easy to go over the content again by replaying the videos." However, a few individuals preferred to have a face-to-face PD. One such teacher said, "I think face to face PD is better because I can get my questions answered quickly and have more opportunities to communicate with other teachers; online

PD is sometimes just for accumulating credit purpose, and I cannot focus too much on it". Therefore, the primary reason that they enjoyed this type of PD was that it provided an opportunity for building social networks with other schoolteachers. They also felt that it was easier to ask questions and interact with trainers.

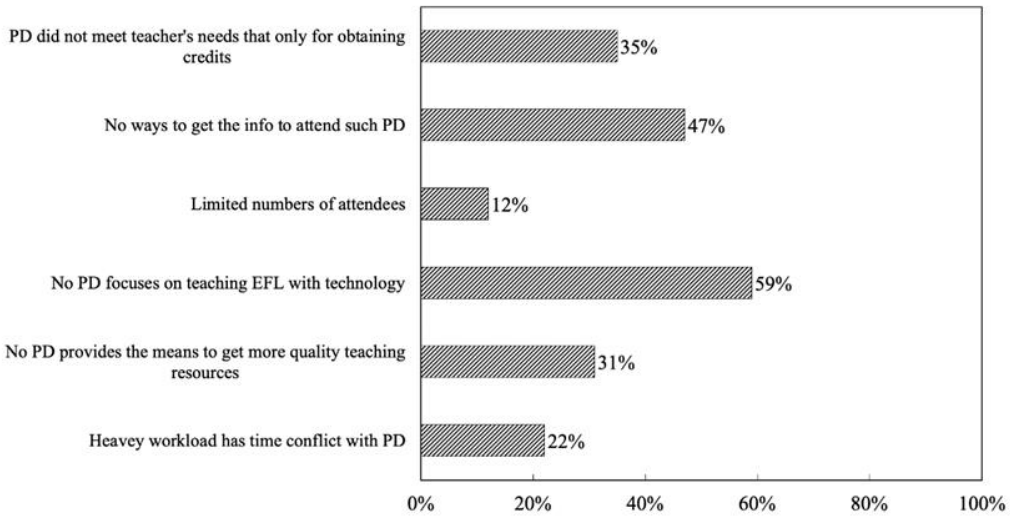

Figure 6. Reasons for perceived insufficient PD

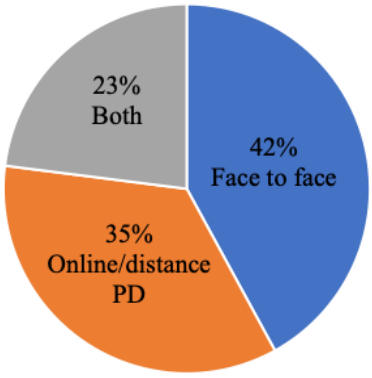

Figure 7. Percentage of PD context preference

Finally, the interview examined types of PD that teachers most look forward to regarding TPACK, including CK, TK PK, TCK, TPK, PCK, and TPACK. Among the group of each knowledge domain, 37% chose to learn more TK, followed by 32% on PK and 31% on CK. Of the combination of any two domains, TPK ranks first at 44%, then, TCK and PCK with respectively 38% and 18%. Last but not least, 93% of teachers voted that TPACK is the most essential one for their future PD training (Figure 8). Therefore, the data indicates that overall, TK, TPK, and TPACK training are in the most demand among EFL teachers.

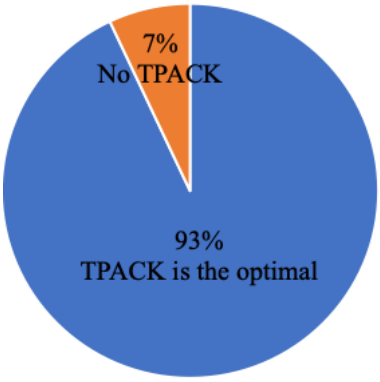

Figure 8. TPACK as the most needed PD training

Discussion

Teachers' Perceptions of Their TPACK and Attitudes Towards Support

Data analysis showed that the most of the teachers in the present study used a teacher-centered approach that uses traditional classroom materials and have adopted limited TPACK in their EFL classes. This finding is in line with Liu and Kleinsasser's study (2015) that EFL teachers are restricted in conventional teaching strategies. Finding from the present study suggests that for teacher's had basic technological knowledge in classroom teaching, however, they do not have sufficient knowledge and lack skills on how to independently solve technical problems for teaching. Therefore, teachers' use of technology is at a basic level.

Also, the results indicate that teachers have limited knowledge of multimedia instruction and features various technology which affects their ability to use enough TPK in teaching. That is, teachers do not have adequate knowledge on how to integrate TPK in their teaching, due to a limited understanding of multimedia instruction and an inability to provide multimedia instruction. For example, even though nearly half of the teachers reported using the Smartboard in teaching, only 13% of the them believed themselves as skilled in using the smart functions of the whiteboard. Moreover, teachers reported not used to incorporate a combination of visual, auditory, and translation features of educational technology to increase student interaction and not having sufficient knowledge about the resources of language learning websites/platforms. These evidences revealed that teacher may lack instructions and need more training in learning how to incorporate the smart function of the educational technology into real classroom teaching.

Additionally, though EFL teachers have a good sense of TPACK in teaching the listening skills of language, they are lacking TPACK in developing learners' other language skills in learning English. As teachers indicated in the study, lack of resources given from the district and school might be an obstacle in implementing technology integration in classroom teaching. Also, we could infer that lacking adequate PD training among EFL teachers regarding TPACK would possibly account for the low level of their TPACK, which is in line with the findings of previous studies found in other regions (Alnajjar & Al-Jamal, 2019; Liu et al., 2014). Hence, the results of this study suggest that it may be necessary to offer more enriched training in the technology integration related topics in teacher development programs, and allow teachers to have extensive practices on these skills as it related to EFL instruction.

According to teachers' responses to the interview, most of the EFL teachers have positive attitudes towards the benefit of teaching by TPACK in their EFL class, but they indicated that they had few resources given by the school district which resulted in limited skills is the use of TPACK. District and school admins need to provide more quality resources and access to help teacher to be competent in teaching digitally. In addition, teachers indicated that they experienced many difficulties in teaching digitally (e.g., lack of hardware, software, equipment not working), which resulted in a high rate of dissatisfaction. Therefore, stakeholders including school administrators and district teacher professional development training programs should increase their attention and give more support to facilitate these EFL teachers professional learning.

Research indicated that teachers' PD training, grounded on the conceptual framework of TPACK, has powerful effects on teachers' instructional skills assisted with educational technology (Caromawati, 2017; Liu &

Kleinsasser, 2015). According to the report from the teachers, peer observation and peer coaching are effective PD approaches in improving their TAPCK and its related skills. More than half of the teachers mentioned that they had experience in observing master EFL teacher's exemplar (teaching with technology integration as a way of professional development. This peer observing approach gave them aspirations on their own teaching. Research has found similar results that peer observation, as a way for teacher development, is effective for increasing teachers of EL's beliefs in their ability of classroom teaching (Mousavi, 2014). Moreover, teachers in this study also received feedback from exemplar EFL teachers when they were observed by exemplar teachers for real classroom teaching. The feedback included information on how to integrate technology in teaching EFLs more effectively and efficiently which had positive effects on improving teaching strategies. Thus, we can draw an assertion that, teachers, who are supported with more TPACK related PD training specifically in EFL subject areas, might achieve a higher level of instruction skills and maximize their potential to integrate the knowledge of teaching content technologically and pedagogically.

PD Opportunities and PD Needs

The results of this study indicate that EFL teachers had insufficient opportunities to participate in TPACK related PD training. This is of concern since teacher's knowledge of technological, pedagogical, and content integration provides student-centered instruction that opens access in multidimensional language learning to fulfill the needs of EFL learners. Since the ongoing training and development for teachers on their technological, pedagogical and content knowledge along with the practice in technology integration skills are highly associated with their teaching performance and outcomes (Akturk & Ozturk, 2019), the TPACK-related PD training for EFL teachers plays a significant role in promoting the quality of teaching effectiveness, which needs to be improved in teacher PD training programs. Further, teachers' awareness of enhancing their TPACK related skills might not be appropriately reinforced by the schools and districts as they reported limited ways to get the information for the related PD training. Therefore, it is important for EFL teachers to be motivated to equip themselves with the skills required to incorporate technology, since incorporating technology in their teaching has can benefit students' learning and performance.

In addition, this study examined the EFL teacher's PD needs related to technology integration in teaching. To be more specific, the TK, TPK, and TPACK are identified as the three knowledge aspects that are needed the most among primary-level EFL teachers. Mishra and Koehler (2006) stated that TK is a foundation knowledge for instructors being able to integrate technology. Teachers with little knowledge of technology might lead to limited integration of technology with appropriate pedagogy to engage student in-class, which would result in a lack of TPK. As such, the integration of TK and PK needs to be addressed in PD training programs particularly as it related to EFL. Thus, it eventually promotes both teachers' instructional efficiency and students' performance.

Conclusions and Implications

In this study, EFL teachers indicated using traditional classroom materials with limited use of technology due primarily to their limited skills in the application of TPACK. In addition, teachers felt that there was not adequate PD training for EFL teachers to assist them in integrating technology in their teaching. This training is limited because of the limited resources provided by the school district. Interestingly, most of the EFL teachers reported having positive attitudes towards the benefit of teaching by TPACK in their EFL classes and would like to teach digitally. The present study provides stakeholders with an effective approach to evaluate teachers' knowledge skills and their ability to incorporate technology into teaching their EFL students. The participants displayed the lack of ability in manipulating technology in EFL with appropriate pedagogies and proposed robust needs in receiving relevant PD activities regarding their demands in TPACK-EFL. PD training should be developed that provide second language teachers with knowledge and skills necessary to integrate technology in their EFL teaching. It is not just adding technology to the existing teaching and content domain, but rather teachers need consistent training in how to make connections between technological knowledge, pedagogical knowledge, and content knowledge.

While the study provides information on the impact of teacher PD on their TPACK, there are a few limitations of this study. First, though there are other elements of TPACK, such as CK, PK, and CPK, which account for the effects on teacher's TPACK in teaching EFLs, we did not include them in this study since they are not the focus of this study. However, future studies could consider including more factors that impact teacher's level of TPACK in teaching EFLs in order to provide more insight on teacher PD in TPACK teaching EFLs and its related topics. Additionally, while the data source of interviews provides meaningful information, the interview data is self-reported by the participants. Future experimental or intervention studies may be conducted to analyze the effect of

the TPACK-EFL PD and teacher's knowledge of TPACK.

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Self-Regulation Skills and Peer Preferences in Preschool Children

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Abstract
The preschool period is recognized as a crucial phase for fostering the social development of children. Self-regulation during the developmental period contributes to management skills in social contexts and thus helps establish positive standards of behavior for peer relationships. Effective interventions can improve self-regulation skills. The main purpose of this study is to detect the predictive impact of self-regulation skills on peer relationships in preschool children. The participants consisted of 165 children of Turkish extraction (between the ages of 5 and 6). 81 of them were girls, and 84 were boys. The Self-Regulation Skills Scale for Children aged 4-6 (Teacher Form) and the sociometry technique based on peer nomination were utilized. The study results asserted that young children's self-regulation variables (inhibitory control, attention, and working memory) influenced their levels of being positively and significantly liked by peers. Moreover, young children's self-regulation variables (inhibitory control, attention, and working memory) affected their levels of being negatively and significantly disliked by peers. Also, inhibitory control, attention, and working memory significantly predicted the levels of social preference.

Keywords: Preschool, Self-regulation skills, Sociometry, Peer relations

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Introduction

Recently, there has been growing attention to the prominence of self-regulation (S-R) in the development, learning, and social relations of individuals. It is described as a phenomenon that starts at birth and develops into adulthood, gaining significance at every stage of an individual's life (McCabe et al., 2004; McClelland & Cameron, 2012). Self-regulation refers to controlling and managing one's wishes, thoughts, emotions, and behaviors; conforming to norms in social relationships; and focusing and maintaining attention (Bauer & Baumeister, 2011; Koole et al., 2011; Posner & Rothbart, 2009). Self-regulation, which has a multifaceted structure associated with both positive and negative adjustment, includes working memory, attention, and inhibitory control (Astarlar, 2019; McClelland & Cameron, 2012; Skibbe et al., 2011). Inhibitory control, which involves the regulation of behaviors, refers to one's ability to suppress impulses to attain goals (Cuevas et al., 2018; Posner & Rothbart, 2000). This structure is important for emotional, social, and cognitive development (Watson & Bell, 2013). It, particularly during early childhood, assumes a crucial role in controlling the magnitude of emotions such as sadness, joy, fear, and anger (Carlson & Wang, 2007; Whitebread & Basilio, 2012). Executive attention, one of the executive functions that contribute to S-R, refers to regulating and maintaining attention levels and ignoring distracting or irrelevant stimuli (Ruff & Rothbart, 1996; cited in Harris et al., 2007). Social interaction relies on the ability to coordinate attention with another individual; such an ability develops with adult partners over the last half of the first year of life (Butterworth, 2001; Striano & Rochat, 1999). Working memory, on the other hand, is the ability to store information and transform it when necessary (Baddeley, 2012; Storbeck & Maswood, 2016). Researchers report that working memory begins to develop at around four years of age (Baddeley & Hitch, 2007; Öztürk et al., 2009) and continues to develop during adolescence, making rapid progress after the age of six years (Gathercole et al., 2004). Self-regulation is considered the building block of early childhood development (Eisenberg et al., 2004; Gillespie & Siebel, 2006; Shonkoff & Phillips, 2000). In preschool years, inhibitory control contributes to cognitive skills by allowing for the flexible use of working memory and attention (Diamond, 2013). Several studies have revealed that the effects of these mechanisms on children's behaviors play a major role in academic success, emotion management, and social interaction during early childhood (Anderson, 2002; Blair & Raver, 2015; McClelland & Cameron, 2012; McClelland et al., 2019).

The childhood years are a period during which important developments take place in terms of peer relationships. Peer relationships are characterized as interactions among individuals who share similar characteristics, age, developmental level, and social context (Özokçu, 2018). Such relationships encompass both positive aspects, such as peer acceptance, being liked, and having playmates, as well as negative psychosocial behaviors like rejection, dislike, and experiencing bullying (Çiçekoğlu et al., 2019). Investigations indicate that children accepted by their peers tend to exhibit social, altruistic, cooperative, sensitive, and adaptable behaviors (McDonald & Rubin, 2017). There appears to be a likelihood that prosocial behaviors result from successful peer interactions and relationships (Wang et al., 2021). Conversely, children not preferred by their peers are more likely to exhibit aggressive and disruptive behaviors, particularly towards their peers, as well as tendencies towards shyness, social anxiety, and introversion (LaFreniere & Dumas, 2003; McDonald & Rubin, 2017).

The age range of 4-6 years in peer relationships represents a period of rapid growth and development, during which children demonstrate the ability to join and engage in peer groups (Guralnick et al., 2006). Children's interactions with their peers in the preschool years provide them with various competencies and rich experiences (Gülay Ogelman, 2018). It supports the acquisition of new skills, knowledge, and behaviors with its functions such as modeling, sharing, and being a valuable source of information. (Bukowski et al., 2018; Erwin, 2000). Thanks to the social contexts and norms they offer, they contribute to all developmental areas of children, especially to their self-regulation skills. It is reported that the play skills children exhibit when playing with their peers, which is considered an important social context in preschool, are associated with their S-R levels; children with higher levels of self-regulation tend to show greater play skills (Adak Özdemir & Budak, 2019; Aksoy & Yaralı, 2017; Yurdakul, Beyazıt & Bütün Ayhan, 2021). Murray et al. (2015) indicate that the ability to delay gratification and regulate behaviors according to goals and rules facilitates positive social behaviors such as sharing and cooperative play. Furthermore, effortful control and positive emotionality assist young children in establishing play relationships, and over the course of the year, peers within play groups exhibit similarities in these traits (Neal, Durbin, Gornik, & Lo, 2017). The structure of play, with its capacity to foster strong relationships among children, can provide rich experiences related to examples of behaviors they like and dislike (Cederborg, 2021).

Within the developmental trajectory, self-regulation contributes to the management skills in social interactions, thereby aiding in the establishment of positive behavioral standards in children's peer relationships. The ability to regulate behavior is associated with positive peer relationships (Ramani et al., 2010). For instance, children with

better behavior regulation may experience greater peer acceptance and sociability while experiencing fewer peer conflicts and bullying. This is because this skill enables children to recall rules in peer or classroom contexts and inhibit inappropriate behaviors (Fabes et al., 2009; Hernández et al., 2017; Holmes et al., 2016; Williford et al., 2013). Thus, Robson et al. (2020) found that self-regulation at age 4 is positively associated with social competence and negatively associated with peer bullying in the first grade. Conversely, as children are accepted and liked by their peers, their impulses to engage socially with peers also increase. Researchers such as Hamaidi et al. (2021) report that interaction with peers is associated with emotion regulation, suggesting that children with higher emotion regulation skills are more likely to engage with peers due to their greater ability to cope with negative emotions. Additionally, various studies link successful peer interaction skills with prosocial behaviors (López-Pérez & Pacella, 2021; Wang et al., 2021). Peer relationships during the preschool years are likely to affect the short- and long-term social and emotional adjustment of children (Ladd et al., 1996). Positive relationships with peers can positively affect children's self-perception, social competence, and psychological well-being in the short term (Wentzel, 2017). Nevertheless, problems in peer relations during this period may lead to anxiety, withdrawal, peer rejection, and depression in years to come (Beyazıt, 2019; Coie, 1990; Emre et al., 2020). A large number of studies have demonstrated that relationships with peers in preschool are predictive of later academic and psychosocial functions and are associated with externalizing difficulties such as antisocial behaviors and aggression (Gifford-Smith & Brownell, 2003; Green et al., 2008; Gülay Ogelman, 2021; Levine & Munsch, 2014).

Self-regulation and peer relationships in young children are seen as variables that are likely to influence one another in the short and long run. If developed and supported during childhood, self-regulation skills will positively affect children's peer relationships. Determining the levels of self-regulation in the early years will provide timely and considerable support to children who have problems with their peers, and this might even prevent problems before they arise. There are a few studies in Turkey investigating to what extent the self-regulation skills of young children are disliked and liked by peers. The main aim, therefore, is to detect the predictive power of self-regulation skills on peer relationships in preschool children. This study seeks to address the following questions:

1. Do S-R skills (inhibitory control, attention, and working memory) of preschool children predict being liked by peers in a statistically significant manner?
2. Do S-R skills (inhibitory control, attention, and working memory) of preschool children predict being disliked by peers in a statistically significant manner?
3. Do S-R skills (inhibitory control, attention, and working memory) of preschool children predict social preference level in a statistically significant manner?

Method

Research Model

The study was designed using a correlational survey design. The selection of the sample group for the study was based on the method of random sampling.

Participants

The participants consist of 165 Turkish children (5–6 years old). While 84 of them were boys (51.0%), 81 were girls (49.0%). The average age of the participant children is 5 years and 7 months. While forming the sample group, kindergarten classes of 5 primary schools and 3 independent kindergartens are determined among the primary schools and independent kindergartens located in Niğde by using the randomized sampling method.

Data Collection Tools

Self-Regulation Skills Scale for Children Aged 4–6 (Teacher Form)

The scale was developed by İvrendi and Erol (2018) to detect the S-R skills of children aged 4-6 years. It consists of 22 items and three subscales: inhibitory control (eight items), attention (nine items), and working memory (five items). Items are formulated as statements that are to be rated on a 5-point Likert-type scale (1 never, 5 always). It is a scale based on teacher evaluation. Scores can be calculated for each subscale and can be summed to provide a total score for S-R. Higher scores indicate greater self-regulation skills. Cronbach's alphas for subscales were found to be .91, .91, and .87 respectively. The Cronbach Alpha coefficients for subscales were .92, .94, and .95, respectively.

Sociometry

The "Sociometric Technique" for preschool children developed by Marshall and McCandless (1957) was selected for use in the present study (McCandless & Marshall, 1957; cited in Gulay Ogelman, 2019). Children can make choices according to criteria such as my best friend(s), my least favorite friend(s), and my friend(s) whom I like or dislike to play with. In our study, children are asked to state their most and least favorite friend(s) in the classroom. They answered two questions: "What are the names of your three best friends?" and "What are the names of your three least favorite friends?" Following the interviews, popularity scores were calculated for each child. Names were scored in the order in which they were said (i.e., 3, 2, and 1 points for the first, middle, and last names, respectively). The points were summed up to get the total popularity and unpopularity scores.

Procedure

A specialized personnel applied the sociometry technique based on peer nomination at different times to all children in the classroom. Teachers filled out the Self-Regulation Skills Scale for Children aged 4-6 (Teacher Form) for each child.

Data Analyses

The data were analyzed using the SPSS 24.0 software. The values of Kurtosis and Skewness were computed to test the normality of the data set. It was seen that the distribution had values ranging between -1,5 and +1,5 and indicated no significant deviation from normality (Tabachnick & Fidell, 2013). Pearson product moment correlation coefficients were calculated for the relationship between children's S-R skills and liked and disliked by their peer and social preference variables. Linear regression analysis was conducted to detect the predictive impacts of S-R variables on peer relationships.

Findings

Table 1. Correlation and descriptive statistics between the variables S-R and being liked by peers

	1	2	3	X	SD
1.Being liked by peers	-	-	-	.386	1.190
S-R skills subscales					
2. Inhibitory control	.300*	-	-	32.727	5.00
3. Attention	.364*	.610*	-	36.072	6.395
4. Working memory	.379*	.614*	.724*	21.630	3.280

**p < .001*

As shown in Table 1, a statistically significant positive correlation existed between the self-regulation variables (inhibitory control r=.300, attention r=.364, working memory r=.379, p<.001) and being liked by peers. That is, as children's self-regulation scores increase or decrease, their level of preference by their peers also increases or decreases.

Table 2. Linear regression analysis regarding S-R variables in children and their level of liking by their peers

S-R skills subscales	Being liked by peers						
	R	R2	F	Std.Error	β	t	p
Inhibitory control	.300	.090	16.129	.018	.071	4.016	.000*
Attention	.364	.132	24.863	.014	.068	4.986	.000*
Working memory	.379	.143	27.285	.026	.137	5.223	.000*

**p < .001*

When examining Table 2, self-regulation variables (inhibitory control (R=.300, R^2=.10, F=16.129, p<.000), attention (R=.364, R^2=.132, F=24.863, p<.000), and working memory (R=.379, R^2=.143, F=27.285, p<.000) significantly predicted levels of being liked by peers.

Table 3. Correlation and descriptive statistics between the variables S-R and being disliked by peers

	1	2	3	X	SD
1. Being disliked by peers				.299	1.308
S-R skills subscales	-	-	-		
2. Inhibitory control	.296*	-	-	32.727	5.008
3. Attention	-.421*	.610*	-	36.072	6.395
4. Working memory	-.309*	.614*	.724*	21.630	3.280

$p < .001$

When examining Table 3, it is evident that there exists a significant negative relationship between self-regulation variables and levels of peer non-preference (inhibitory control: r = -.296, attention: r = -.421, working memory: r = -.309, p < .001). Thus, it can be inferred that as scores in inhibitory control, attention, and working memory increase or decrease, the level of non-preference from peers increases or decreases.

Table 4. Linear regression analysis regarding S-R variables in children and levels of being disliked by peers

S-R skills subscales	Being disliked by peers						
	R	R2	F	Std. Error	β	t	p
Inhibitory control	.296	.088	15.676	.020	-.077	-3.959	.000*
Attention	.421	.177	35.117	.015	-.086	-5.926	.000*
Working memory	.309	.096	17.253	.030	-.123	-4.154	.000*

$p < .001$

When examining Table 4, self-regulation variables inhibitory control (R=.296, R^2=.09, F=15.676, p<.000), attention (R=.421, R^2=.18, F=35.117, p<.000), and working memory (R=.309, R^2=.10, F=17.253, p<.000) significantly predict levels of being disliked by peers in 5–6 year-old children.

Table 5. Correlation and descriptive statistics between the variables S-R and social preference

	1	2	3	X	SD
1. Social preference	-	-	-	.086	2.233
S-R skills subscales					
2. Inhibitory control	.334*	-	-	32.727	5.008
3. Attention	.441*	.610*	-	36.072	6.395
4. Working memory	.383*	.614*	.724*	21.630	3.280

$p < .001$

When examining Table 5, a statistically significant positive correlation existed between the self-regulation variables (inhibitory control r=.334, attention r=.441, working memory r=.383, p<.001) and social preference levels. Self-regulation variables (inhibitory control (R=.334, R^2=.111, F= 20.399, p<.000), attention (R=.441, R^2=.194, F=39.267, p<.000), and working memory (R=.383, R^2=.15, F=28.042, p<.000) significantly predicted the levels of social preference (Table 6).

Table 6. Linear regression analysis regarding S-R variables in children and levels of social preference

Self-regulation skills subscales	Social preference						
	R	R2	F	Std. Error	β	t	p
Inhibitory control	.334	.111	20.399	.033	.149	4.516	.000*
Attention	.441	.194	39.267	.025	.154	6.266	.000*
Working memory	.383	.147	28.042	.049	.261	5.296	.000*

*$p < .001$.

Results and Discussion

Young children's self-regulation variables (inhibitory control, attention, and working memory) influence their levels of being liked by peers. Preschool children's inhibitory control, attention, and working memory increased; their levels were preferred by their peers. Young children's self-regulation variables (inhibitory control, attention, and working memory) might be less preferred by their peers. Preschool children's inhibitory control, attention,

and working memory increased, and their levels of being disliked by peers decreased. Also, the inhibitory control, attention, and working memory of young children significantly predict their social preference levels.

Our results indicate that children's self-regulation skills may affect peer relationships overall and in terms of variables. This might suggest that self-regulation has significant effects on peer relationships. Saraç et al. (2021) found that self-regulation and its dimensions significantly predict all peer-relationship variables (prosocial behaviors, asocial behaviors, aggressive behaviors, hyperactivity-distraction, exclusion by peers, and fear-anxiety) in 48- to 82-month-old children. Gülay Ogelman and Fetih (2021) reported that children's emotional regulation strategies have a predictive effect on dealing with social preferences, peer pressure, and aggression levels. In a study, 24-month-old children were observed in a series of laboratory procedures, and it was found that negative affectivity is significantly related to conflict with peers (Calkins et al., 1999). By contributing to control skills in social relations, self-regulation paves the way for the formation of positive behavior standards in peer interactions (Calkins, 2007; Robson et al., 2020; Rubin et al., 2003; Shaw et al., 2000). It is argued that a high level of self-regulation can improve social competence. (Duckworth & Kern, 2011; Moffitt et al., 2011; Robson et al., 2020). Children with high-level self-regulation competence can control themselves emotionally and behaviorally, delay their wishes, and exhibit active, social, sharing, and relaxed attitudes during interactions with their peers in both social and academic environments. They tend to act less impulsively when faced with problems in peer relationships and may exhibit more conciliatory and relaxed attitudes. In this way, they can increase peer sharing and improve their relationships with their peers. A study conducted on a sample of 3–4-year-old children found that children who can better control their impulses are more compatible and friendly, show positive behaviors towards their peers, and do not engage in rebellious or defiant behaviors toward adults (Ramani et al., 2010). Similarly, Vasseleu et al. (2021) reported that children with better self-regulation skills are more successful in tasks requiring attention, and they can exert a lot of effort in challenging tasks and show more social behaviors such as taking a turn and sharing toys. It is argued that emotion regulation strategies, social skills, and play behaviors are important skills that might affect popularity among peers (Keane & Calkins, 2004). Berg et al. (2015) found that children who are popular in their peer group have positive social skills such as cooperation and teamwork compared to unpopular children. It is reported that lower self-regulation skills in preschool children are negatively correlated (Beyazıt, 2019) with behavioral problems, social dissatisfaction, and withdrawal (Emre et al., 2020). Problems with behavioral regulation may cause problems in peer relationships in young children (Hughes et al., 2000). Aggressive behaviors are likely to have a negative impact on positive social changes and dynamics (McComas et al., 2005). A number of studies on children revealed that aggressive behaviors are associated with rejection by peers, while gentle and friendly behaviors are associated with peer acceptance (Ladd & Burgess, 1999; Johnson et al., 2000; McDonald & Rubin, 2017; Snyder et al., 2004). Similarly, Huh et al. (2003) found a high correlation between the problem behaviors of children and to which they are preferred by their peers. In their study, Erol and Gülay Ogelman (2020) reported that the level of popularity is lower in children with aggressive behaviors as evaluated by both teachers and peers. In other words, children who are less preferred by their peers tend to show more externalizing behavior than those with higher peer preferences (Bukowski & Hoza, 1989). Similar results were obtained in studies conducted across different cultures. For example, some studies carried out in the USA showed that children with high levels of negative emotionality (neuroticism) and low self-regulation were identified as those who are most prone to externalization problems or low social competence (Eisenberg, Fabes, Guthrie et al., 1996). In addition, a series of studies have found that children with poor S-R skills tend to have behavioral problems and are less successful in peer relationships (Eisenberg et al., 2001; Eisenberg et al., 2004; Tozduman Yaralı & Güngör Aytar, 2017). It is underscored that peer acceptance fosters a child's self-worth (Patterson Mallin, 2003), and it is a protective factor in their development (Hay, 2006; Schrepferman et al., 2006). An increased level of self-regulation skills in preschool influences children's self-perception positively, and children's ability to manage and regulate their thoughts, feelings, and behaviors enables them to develop a positive attitude towards themselves (Tuzcuoğlu et al., 2019). Children and adolescents who can control their impulses and reflect on their actions are more successful in making friends and developing good relationships with others. They can develop less conflicting and more harmonious relationships with their families and friends (Bandy & Moore, 2010; Baumeister et al., 2007). When young children are liked by their peers and have regular and positive relationships with them, they feel more comfortable and happier in school, and this makes it easier for them to enjoy school. It is stated that children who are accepted and liked by their peers are more successful in adapting to school (Johnson et al., 2000), feel more willing to participate in school activities, and take a more positive attitude toward school (Aydoğdu, 2022; Bossaert et al., 2011; Ladd & Burgess, 2001; Lakhani et al., 2017). Problems in peer relations negatively affect children's classroom participation (Ladd et al., 1999) and may cause emotional problems such as attention deficit, shyness, anxiety (Ladd & Burgess, 2001), adjustment problems (Buhs et al., 2006), social dissatisfaction, avoidance of peer interaction, and loneliness (Cassidy & Asher, 1992; Ladd et al., 1997). It is reported that a link exists between early peer relationships and

adolescent psychological adjustment (Shin et al., 2016). Not being preferred by their peers in preschool may result in depression, dropping out of school, substance abuse, delinquency, social anxiety, and antisocial behaviors in the long run (Hay, 2006; Hay et al., 2004; Polenski, 2001; Reijntjes et al., 2006; Shin et al., 2016; Smith et al., 2005). Such findings suggest that individual differences in both self-regulation and adverse affectivity jointly contribute to the quality of social functioning (Eisenberg et al., 2000; Eisenberg et al., 2010).

Conclusion and Recommendations

Preschool represents an important early environment and an optimal time for the development of social skills and peer relationships (Johnson et al., 2000; Han, 2012). As emphasized by Howes and Matheson (1992), cognitive and emotional skills have a central role in the peer relationships of young children. Therefore, it is important to identify children who are less preferred by their peers, have poor self-regulation skills, and suffer from externalizing and internalizing behavior problems at an early age so that problematic behavior patterns do not persist throughout their lives (Blair, 2002). Self-regulation problems in the first years of life can manifest themselves as serious problems such as risk-taking, relationships, well-being, employment problems, and poor decision-making during adolescence and adulthood (Moffitt et al., 2011). Several studies have shown that self-regulation can be improved through interventions in early childhood (Dan, 2016; Flook et al., 2015). Early interventions can help prevent future social challenges for children. Planned and effective self-regulation strategies implemented by teachers may help children achieve psychological well-being and improve their social behavior. In this regard, plans need to be made to improve the self-regulation skills of young children, especially in kindergartens. Preschool professionals should include activities that support young children's self-regulation skills in their daily programs. Parents, as well as teachers, have a key role in the formation of children's behavioral orientations. Not only the behavioral orientation of young children but also their level of competence is influenced by family factors. Parents should be included in these activities, and children with self-regulation problems should be supported by school-family cooperation. Moreover, the results have implications for developing positive self-regulation strategies not only for teachers but also for parents.

Exploring the positive self-regulation strategies of parents can provide insights into the benefits of a strength-based approach to children's positive emotions. Parents and teachers who develop children's positive emotions may also be supporting their self-regulation, which has long-lasting impacts on children's emotional and social outcomes in the future. This is a research study that examined children's self-regulation skills and peer relationships in the preschool period. Longitudinal studies are needed to explore the impact of self-regulation skills on peer relationships in the preschool period.

Ethical Approval

We declare that the study has no unethical problems, and ethics committee approval was obtained from Nigde Omer Halisdemir University, Nıgde (Place: Nigde Omer Halisdemir University, Date: 28.04.2022, Number: 2022/05-52).

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