



Investigation of Higher Education Students' Use of Learning Strategies in Distance Education

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Abstract

In addition to developing learning strategies, it is essential to determine students' mastery of these skills. In this context, the purpose of this study is to adapt into Turkish the instrument developed by Meijs et al. (2019) to determine the use of learning strategies required by learners in distance education environments. The second objective is to analyze the data to be obtained from the adapted scale in terms of multiple variables and to disclose the status of students' use of learning strategies in environments of distance education in Turkey. In this research, a survey study design was used to fully reveal the learning strategies that students use for distance education. The Motivated Strategies for Learning Questionnaire Part B Distance Education (MSQL-B DE) scale and a personal information form containing demographic and other student information served as data collection instruments. In this research, both EFA and CFA were applied. Additionally, the parameters derived from Confirmatory Factor Analysis indicated that the model was compatible. Complex cognitive strategy use has the highest mean when the findings are analyzed according to the means. Simple cognitive strategy use, academic thinking, and time, resource, and effort management are the respective strategies used. Compared to the other strategies, communication with others was determined to be the least utilized. The results of the study contain as many diverse elements as possible in accordance with the literature on the application of learning strategies in the distance education process. In future research, it may be possible to investigate various aspects of learning strategies in distance education, including course processing and academic achievement.

Keywords: Keyword, Learning Strategies, Distance Education, Higher Education, Factor Analysis

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Yükseköğretim Öğrencilerinin Uzaktan Eğitimde Öğrenme Stratejilerini Kullanma Durumlarının İncelenmesi

Özet

Öğrenme stratejilerinin geliştirilmesi kadar öğrencilerin bu becerilere ne düzeyde sahip olduklarının belirlenmesi de önemlidir. Bu kapsamda çalışmanın amacı, uzaktan eğitim ortamlarındaki öğrenenlerin ihtiyaç duydukları öğrenme stratejilerinin kullanım durumunu belirlemek için Meijs ve arkadaşları (2019) tarafından geliştirilen aracı Türkçe'ye uyarlamaktır. İkinci amaç ise, uyarlanan ölçekten elde edilecek verileri çeşitli değişkenler açısından analiz ederek Türkiye'deki uzaktan eğitim ortamlarında öğrencilerin öğrenme stratejilerini kullanma durumlarını ortaya koymaktır. Bu çalışmada, öğrencilerin uzaktan eğitime yönelik kullandıkları öğrenme stratejilerini tümüyle ortaya koymak amaçlı tarama çalışması deseni kullanılmıştır. Araştırmada veri toplama aracı olarak, öğrencilerin demografik ve diğer bilgilerini içeren kişisel bilgi formu ve MSQ-DE ölçeği kullanılmıştır. Bu çalışmada AFA ve DFA birlikte kullanılmıştır. Doğrulayıcı Faktör analizinden elde edilen parametreler de modelin uyumlu olduğunu göstermiştir. Bulgular incelendiğinde ortalamalara göre karmaşık bilişsel strateji kullanımı en yüksek ortalamaya sahiptir. Basit bilişsel strateji kullanımı, akademik düşünme ve zaman, mekân ve çaba yönetimi sırasıyla kullanılan stratejilerdir. Başkalarıyla iletişim stratejisi diğerlerine göre en az kullanılan strateji olarak belirlenmiştir. Araştırmanın sonuçları uzaktan eğitim sürecinde öğrenme stratejilerinin kullanımı konusunda literatürden edinilen veriler doğrultusunda farklı öğelerle mümkün olabildiğince zengin bir içerik sağlamaktadır. Gelecek çalışmalarda uzaktan eğitimde öğrenme stratejilerine yönelik farklı öğelerin çalışılması durumu söz konusu olabileceği gibi işin içerisine ders işleme süreci ve akademik başarı gibi etkenler de dahil edilebilir.

Anahtar Kelimeler: Öğrenme Stratejileri, Uzaktan Eğitim, Yükseköğretim, Faktör Analizi

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1. Introduction

There is considerable research on learning strategies, their impact on learning, and their relationship with instructional contexts based on more than 50 years of study history. One reason is that learning strategies encompass all cognitive, affective, and behavioral processes that help students regulate and learn well (Kizilcec et al., 2017). Another factor that contributes to its popularity is the recognition that learning strategies (Rachel et al., 2007), also known as the methods and techniques that students use to improve their learning, are not an innate ability but can be learned through experiences (McKeachie, 1988), and have a developable structure (Mayer, 1988). Learning strategies have been reported to be related to academic achievement (Broadbent & Poon, 2015; Cook et al., 2013; El-Adl & Alkharusi, 2020; Ergen & Kanadli, 2017), motivation (Ames & Archer, 1988; Al-Qahtani, 2013), language learning (Al-Qahtani, 2013; Lin et al., 2017), recall (Goverover et al., 2011; Sankaran & Bui, 2001), problem-solving (Lazakidou & Retalis, 2010; Puteh & Ibrahim, 2010). According to the literature, using learning strategies contributes to learners becoming more effective learners.

In addition to developing learning strategies, determining the extent to which learners acquire these skills is critical (Meijs et al., 2019; Van Hout-Wolters, 2009). Teachers, for example, can use this knowledge to guide learners when needed (Artino & Stephens, 2009), learners can use this knowledge to increase their learning efficiency (Credé & Phillips, 2011), and the level of use of the appropriate teaching method or educational technology in an academic program can be determined using this knowledge (Duncan & McKeachie, 2005). As a result, numerous measurement tools have been developed to identify learning strategies for a wide range of learning objectives, educational levels, and age groups (Duncan & McKeachie, 2005; Pintrich et al., 1993; Shraw & Dennison, 1994; Van Hout-Wolters, 2009; Weinstein et al., 1987).

Based on social cognitive theory, the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1993) is a widely used measurement tool in the literature. Part B of the scale consists of 50 items, three main dimensions and nine sub-dimensions: cognition, metacognition and resource management, which cover only learning strategies. Cognition strategies consist of iteration, paraphrasing, organizing and critical thinking; metacognition strategies consist of planning, monitoring and organizing; and resource management strategies

consist of time-study environment, effort, peer collaboration management and asking for help. There are various versions of the scale for different educational levels.

Distance education is becoming more common globally (Allen & Seaman, 2017; Williamson et al., 2020), and its resources are growing constantly (Seaman et al., 2018). The main reasons for this situation are that employees need continuous education (Clarizia et al., 2021; Kyndt et al., 2011), the need for lifelong learning is accepted by large segments of society (Ates & Alsall, 2012), and distance education has become inevitable in extraordinary situations such as epidemics and disasters (Williamson et al., 2020). In addition, distance education supports individual and social development by providing opportunities such as educational equality, efficient use of resources, and learning independent of time and place (Simonson et al., 2015). In addition to these contributions, Meijs et al. (2019) argue that students' use of learning strategies is even more crucial for the effective maintenance of distance education than face-to-face education. Distance education environments may differ from face-to-face teaching with their aged participants, who have various responsibilities other than being a student and with their working mass (Simonson et al., 2015). Therefore, the anticipated learning strategies of students who receive face-to-face education versus those who receive distance education are distinct (Meijs et al., 2019). This situation necessitates the development of a distance education-specific instrument for measuring learning strategies.

Meijs et al. (2019) revealed that the MSLQ tool developed by Pintrich et al. (1993) was unsuitable for determining learning strategies in distance education environments. They made some adjustments to the factors and items of the original scale. After factor analysis, they created a valid and reliable tool for determining learning strategies in distance education environments. The new instrument consists of five factors and 25 items: time, resource, and effort management; complex cognitive strategy use; simple cognitive strategy use; communication with others; and academic thinking.

Two aims are present in this study. A Turkish language scale for assessing learning strategies in distance education environments needs to be available. The primary objective is to translate and culturally adapt the MSLQ B (DE) scale, developed initially by Meijs et al. (2019), to assess the utilization of learning strategies in distance education in the Turkish language. Furthermore, this scale acquired a valid and reliable instrument for future investigations on

learning strategies among diverse sample populations. The second goal is to examine the data generated by the adapted scale in terms of various variables to show the state of students' use of learning strategies in distance education environments in Turkey. Hence, the outcomes derived from a cohort of 609 participants were presented. The following research questions are being asked in accordance with these aims:

- *What is the factor structure of the measurement tool adapted to Turkish to determine the use of learning strategies for distance education?*
- *Does the students' learning strategy usage status differ according to the department, gender, course follow-up tools, participants' teaching method preference, key factors in the distance education, participation in extracurricular activities, and participants' weekly study hours?*

2. Background

2.1. Learning Strategies

Students employ various learning strategies to manage their academic goals, accomplishments, and learning methods (Neroni et al., 2019). Mayer (1988) describes these tactics as behaviors set to dictate the way students handle and utilize information. In their research, Weinstein and Underwood (1985) discussed the term "learning strategies," highlighting methods deemed essential or beneficial by experts for efficient learning and knowledge application. Further elaborating, Weinstein and Mayer (1986) explained these strategies as internal and external activities impacting a learner's motivation, focus, and the way they select and process information. Simply put, the methods involved in organizing, converting, transporting, and applying knowledge are termed learning strategies (Alexander et al., 1998).

Students are expected to be autonomous in their learning processes, to utilize learning tools, and to absorb the information in educational systems. An efficient learning process in and out of school is only possible if students can initiate, direct, and regulate the search for knowledge, as well as process and store this knowledge (Wegner et al., 2013). Learning strategies are essential in managing these processes. Learning strategies are essential to academic performance because they allow individuals to design, monitor, and assess their own learning process (Wegner et al., 2013). According to Donker et al. (2014), it is critical for both the student

and the teacher to identify which learning approach the student will utilize and which will be useful to him/her. Students' usage of learning strategies can help them achieve their objectives (Meijs et al., 2019). Students who understand how to study in a way that ensures that the knowledge and abilities they acquire are permanent will find it easier to learn (Weinstein & Underwood, 1985). Using metacognitive learning strategies to assist active learning has recently become a trend and an innovation in instructional design (Bakar & Ismail, 2020). Learning strategy is acknowledged as a predictive element for students' learning outcomes since an effective learning strategy is always associated to academic accomplishment (Jamaluddin et al., 2021).

Self-regulated learning, which is the process through which students initiate and sustain cognitive activities to attain learning goals (Schunk, 2005; Zimmerman, 2002), is a component of learning techniques. Duncan and McKeachie (2005) classify learning strategies into three categories (Pintrich et al., 1993). These include cognitive, metacognitive, and resource management. Cognitive learning strategies boost students' ability to comprehend material more thoroughly, transfer and apply knowledge to new contexts, and result in more effective and lasting learning (Winn et al., 2019). Cognitive learning strategies include rehearsal strategies, organizational strategies, and elaboration strategies. Extensive research on the effectiveness of cognitive learning strategies shows that using them helps students control their learning processes and improves their outcomes (Hattie et al., 1996; Nota et al., 2004; Murayama et al., 2013; Winn et al., 2019).

Metacognition refers to diverse aspects such as knowledge about cognition, awareness of one's thinking processes, comprehension of the requirements for learning, control of learning processes, and regulation of cognitive processes (Leutwyler, 2009). Metacognitive regulation is defined as "self-management" of cognition that supports awareness and includes reflective "self-evaluation" termed executive control (Tarricone, 2011). It entails planning, monitoring, and evaluation. (Mitsea & Drigas, 2019) Metacognitive strategies refer to monitoring, sequential processes to control learning, high-level executive skills, and decisions made before, during, and after learning. There is evidence that metacognitive strategies support cognitive abilities and meaningful learning (Cook et al., 2013), increase academic achievement (Cera et al., 2013), and boost self-efficacy (Hayat & Shateri, 2019).

Resource management strategies relate to the quality and quantity of engagement in a task and include time management, study environment management, effort management, and support from others (McKeachie et al., 1986). Resource management strategies, also known as non-cognitive strategies, include effort regulation (i.e., continuing to study despite boring, challenging, or uninteresting material), managing both time and place for study, asking for help from teachers or peers, and cooperating with other students or friends (Duncan & McKeachie, 2005). According to Filcher and Miller (2000), resource management strategies include learning schedules, high-quality work, incentives, and instructor interaction. Resource management sets clear objectives and plans the curriculum or content to produce the best results (McKeachie et al., 1986). For adult learners taking distance education courses, resource management strategies are an efficient method of improving success (Filcher & Miller, 2000).

2.2. Learning Strategies in Distance Education

Distance education in higher education institutions has gained prominence and importance with the advent of new technologies. Achieving success and quality in distance education services has become the focus of both educators and researchers (Bilgiç & Tüzün, 2020). While online learning opens up significant opportunities for developed and developing nations, particularly in tertiary education, setbacks can arise when traditional teaching methods are applied (Dahanarajan, 2001). As such, it's imperative to design quality learning strategies to enhance student motivation and success (Burns, 2011). Furthermore, online learning presents unique challenges, especially considering the reduced interaction, continuity, and support compared to traditional classroom settings (Dabbagh & Kitsantas, 2004). This makes the mastery of self-regulation skills especially vital for online students. Given that students often struggle with self-paced learning in virtual environments, the role of effective learning strategies becomes paramount (Bol & Garner, 2011).

In distance education, where the COVID-19 pandemic and the urgent shift to online learning have become necessary at all levels of education, academic success requires strategies different from those used in face-to-face learning settings (Shnaubert & Herold, 2020). In this situation, it has become essential to rethink how students are helped with their studies (Edisherashvili et al, 2022). Self-regulated learning (SRL) is important for face-to-face and distance education (Breslow et al., 2013). Distance education makes the value of SRL clearer. Aspirations,

motivation, and feelings are complex to support in distance learning, so different changes and careful instructional design planning are needed (Shnaubert & Herold, 2020). (Edisherashvili et al., 2022) Because of this, SRL skills and learning strategies are important in distance learning settings. Self-regulated learning is important for online education (Azevedo, 2009; Zimmerman, 2002). Its cognitive, metacognitive, and motivational aspects (Azevedo et al., 2010; Zimmerman, 2008) provide a strong theoretical framework for educational research. Zimmerman (2013) says that self-efficacy is very important. (Zimmerman, 2013) Learners with high self-efficacy are more likely to use SRL methods to reach their goals, while learners with low self-efficacy need external factors to control their learning. Bannert and Reimann (2012) say that it's important to understand individual differences in learner characteristics like course goals, educational level, self-efficacy, and gender, as well as behavior data that shows how learning strategies are related to different variables.

Academic achievement in distance education demands strategies distinct from face-to-face learning contexts, where the COVID-19 pandemic and the urgent transition to online learning have become necessary at all levels of education (Shnaubert & Herold, 2020). In this context, it is critical to evaluate the strategies utilized to assist students in their learning processes (Edisherashvili et al., 2022). Although self-regulated learning (SRL) applies to face-to-face types of learning, the distance education process emphasizes the relevance of SRL (Breslow et al., 2013). Different adjustments and instructional design preparation are required to support enthusiasm, motivation, and emotions, which are difficult to sustain in distance education (Shnaubert & Herold, 2020). As a result, in distance learning environments, SRL skills and related learning techniques are critical (Edisherashvili et al., 2022). Given the significance of self-regulated learning for online education (Azevedo, 2009; Zimmerman, 2002), its cognitive, metacognitive, and motivational characteristics provide a strong theoretical foundation for educational research (Azevedo et al., 2010; Zimmerman, 2008). Zimmerman (2013) stresses the significance of self-efficacy. Learners with strong self-efficacy are more likely to use SRL techniques to reach their goals, whereas those with low self-efficacy require external forces to manage their learning (Zimmerman, 2013). Bannert and Reimann (2012) emphasize the significance of understanding individual differences in commonly observed learner characteristics such as course intentions, educational level, self-efficacy, and gender, as well as behavioral data demonstrating the relationship of learning strategies with various variables.

Zhou and Wang (2021) aimed to test the Chinese version of the Motivational Strategies for Learning Scale Part-B for distance education (MSLQ-B-DE). The results show that the MSLQ-B-DL is a valid and reliable tool for assessing learning strategies in adult distance education in China. Research shows a positive relationship between self-regulated learning strategies and academic performance in a distance education environment (Broadbent, 2017; Lin et al., 2017; Shih & Gamon, 2001). SRL strategies have been found to improve online learners' digital literacy in the context of lifelong learning (Anthonysamy et al., 2020). Orhan (2007), in the research in a blended learning environment, found that the use of strategic self-regulated learning through the systematic application of self-observation, self-evaluation, and adaptation skills regarding learners' activities significantly improved learners' performance and self-efficacy perceptions when metacognitive strategies and resource management strategies were used. Karaoğlan Yılmaz et al. (2018) showed the positive effect of motivational strategy use through pedagogical agents on students' self-regulation skills in different contexts. Jin et al. (2023) showed that artificial intelligence applications in online learning environments are useful in supporting metacognitive, cognitive, and behavioral regulation in different SRL domains. Neroni et al. (2019) investigated the relationship between learning strategies and academic performance in distance education students. The participants comprised 758 students at a distance education university in the Netherlands. An online questionnaire was used to identify learning strategies, and exam grades were taken from the university database to determine academic performance. The mixed method study found that time and effort management and complex cognitive strategy use were positive predictors of academic performance. In contrast, communication with others was a negative predictor of academic performance.

3. Method

3.1. Research Design

In this study, the survey method, one of the quantitative research methods, was used. The survey method provides a quantitative description of the tendencies, attitudes, and opinions in the general population through studies conducted on a sample selected from a population (Creswell, 2013). According to Karasar (2015), the survey method is a study that aims to reveal an existing situation as it is. This study aims to examine the learning strategies used by

university students in terms of various variables in distance education. This study used a survey method to fully reveal the learning strategies that students use for distance education.

3.2. Participants and Implementation

The participants consisted of undergraduate students at a state university in Turkey. Students enrolled in the Atatürk's Principles and History of Revolution course conducted through distance education in the 2019-2020 academic year were included in the study. A total of 909 students participated in the data collection period. The data of 300 students were factor analyzed. The data of 609 participants were also used for analysis. At the end of the Spring 2020 semester, the personal information form and the MSLQ-B DE scale were presented to all students online via Google Forms.

3.3. Data Collection Tools

The study used personal information form including demographic and other information of the students, and the MSQL-B DE scale as data collection tools.

Personal Information Form

A personal information form developed by the researchers was used to determine the demographic and personal information of the students, such as gender, department, home internet usage, distance education preferences, factors they consider important in the distance education process, participation in extracurricular activities, and weekly study time.

Motivated Strategies for Learning Questionnaire Part B Distance Education (MSLQ-B DE) Scale

The MSLQ-B (DE) scale adapted by Meijs et al. (2019) for distance education students was used in the study to determine students' distance education learning strategies. The scale is divided into five subscales that determine the utilization of learning strategies. The scale, which was originally prepared as MSLQ-A (for motivation) and MSLQ-B (for learning strategies), was revised as MSLQ-B DE when it was used for the analysis of learning strategies in distance education processes and new subscales specific to distance education were identified. MSLQ-B DE was chosen for this study since the process was totally conducted via distance education. The scale is constructed as a 7-point Likert-type scale and consists of 25 items. A higher score in the data collected for each subscale (learning strategy) indicates that the stated learning

approach is being used more effectively. In this study, the average scores of the subscales were utilized to establish which learning strategies are used in distance education.

The MSLQ-B (DE) scale has five sub-dimensions, as was earlier mentioned. These include the usage of simple cognitive strategies, complex cognitive strategies, academic thinking, communication with others, and time, resource, and effort management. The original scale has 25 items on a 7-point Likert scale as responses. The application followed this specification. Translations were generated by two separate experts, and they were approved by a third expert, according to Sousa and Rojjanasrirat (2011). At these stages, any changes in meaning brought on by cultural adaptation were also taken into account (Sperber, 2004). With a group of 300 students, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to identify and validate the factor structure. According to Worthington and Whittaker (2006), EFA and CFA should be employed in scale development and adaptation research. Although it is common for adaptation studies to solely utilize confirmatory factor analysis, EFA and CFA were used in this study since it may result in issues like erroneous model fit in situations like translation difficulties (Orçan, 2018).

During the Exploratory Factor Analysis, since the factors were believed to be interrelated, the oblique rotation method (Comer, 2009) was utilized, and a 5-factor structure was obtained based on the compiled version of the scale. Following this analysis, it was determined to remove from the first factor the statement "when the lesson is difficult to study, I either give up or study only the easy parts" because it generated loading values that were comparable across factors. The EFA was repeated once this item is removed, and it was found that there was no any other item with similar load value in different factors. Therefore, the reliability values were examined by assuming that the scale was finalized. Table 1 shows the ultimate factors and Cronbach's alpha coefficients.

Table 1.

Factors and Cronbach's alpha coefficients

No	Item	Factor	Cr.a
1	7, 8, 9, 10, 11	Complex cognitive strategy use	.838
2	17, 18, 19, 20	Communication with others	.786
3	1, 3, 4, 5, 6	Time, resource, and effort management	.824
4	12, 13, 14, 15, 16	Simple cognitive strategy use	.854
5	21, 22, 23, 24, 25	Academic thinking	.868
Cronbach's Alpha (Composit Scale Reliability) = .921			

According to the oblique rotation method, factor loadings after rotation, average variance extracted (AVE), and other factor analysis results are given in Table 2.

Table 2.

Factor Loadings

Item	Factor loadings				
	CCSU	CWO	TREM	SCSU	AT
AVE	37.8%	8.5%	5.4%	4.1%	2.5%
10	.826				
9	.682				
8	.595				
11	.515				
7	.495				
17		.855			
18		.839			
20		.575			
19		.475			
4			.871		
3			.779		
1			.434		
5			.431		
6			.411		
16				.772	
15				.757	
14				.639	
13				.497	
12				.414	
22					.879
23					.808
24					.777
25					.686
21					.407
AVE Total: 58.3%			KMO = .923		
App. Chi-square = 4117			df = 276 sig. = .000		

The parameters obtained from the Confirmatory Factor Analysis also showed that the model fit well ($\chi^2/df=1.85$, CFI=0.95, NFI=0.90, GFI=0.89, and RMSEA=0.05). Since the study used participants' self-report data, a single-factor test was applied to examine possible standard method bias. After exploratory factor analysis, the total variance explained by a single factor was 36.7%, less than 50%. This indicates that there is no significant common method bias in the data. The final 24-item questionnaire instrument was analyzed.

3.4. Data Analysis

It was determined that the data met the normality distribution with the QQ graph. The significance level for all analyses was set as $\alpha < .05$ (Field, 2013). T-test and analysis of variance

test (ANOVA) were applied to determine whether the groups' scores from the tests showed significant differences.

4. Result

4.1. Distribution of Participants by Gender

Considering the demographic data of 609 participants, 356 female (58.5%) and 253 male (41.5%) participants were analyzed.

Table 3.

Distribution of Participants by Gender

Gender	n	%
Female	356	58,5
Male	253	41,5
Total	609	100

4.2. Distribution of Participants by Faculty

Since there was a participant group across the whole university, students were asked to indicate the faculties they studied in. Analyzing the use of learning strategies, since 14 faculties would make analysis burden, faculties were grouped under 5 main headings based on the field and taking into account the number of students. These main fields and their explanations are given in the analysis title. Table 4 shows the distribution of participants according to 14 faculties.

Table 4.

Distribution of Participants by Faculty

Faculty	n	%	Faculty	n	%
Education	118	19,4	Theology	29	4,8
Arts and Science	105	17,2	Tourism	23	3,8
Communication	93	15,3	Veterinarian	16	2,6
Health Sciences	52	8,5	Civil Aviation	16	2,6
Sports Sciences	46	7,6	Forestry	14	2,3
Economics and	44	7,2	Fine Arts and Design	12	2,0
Administrative Sciences					
Engineering and	38	6,2	Medicine	3	0,5
Architecture					

4.3. Participation in Extracurricular Activities

Table 5 shows that students mostly do not participate in extracurricular activities in the distance education process (70.4%).

Table 5.

Participation in Extracurricular Activities

Yes / No	n	%
Yes	180	29,6
No	429	70,4
Total	609	100

4.4. Key Factors in Distance Education

Participants indicated Live courses as the most critical factor in distance education (n=402). Course materials (n=365), interaction (n=282), and feedback (n=188) were chosen as the most essential factors, respectively (Table 6).

Table 6.

Key Factors in Distance Education

Key Factors	n
Live Course	402
Material (video, document, presentation, etc.)	365
Interaction	282
Feedback	188
Usefulness of the LMS	166
Guidance	155
Measurement and Assessment	128
Other	9

4.5. Participants' Course Follow-up Environments

Table 7 shows that students follow the courses mostly on their smartphones (n=374). Three hundred nineteen students said they followed the courses on their personal computers, and 175 students followed the courses on shared devices. With the widespread use of smartphones, it is seen that the highest majority is on smartphones, followed by personal computers.

Table 7.

Course Follow-up Environments

Course Follow-up Environments	n
Smartphone	374
Personal computer	319
Shared device (computer, tablet, etc., shared at home)	175
Tablet PC	28
Outside the home (internet cafe, neighbor, etc.)	24
Other	2

4.6. Participants' Teaching Method Preference

Table 8 shows that most students preferred face-to-face education (64.9%, n=395) or hybrid (22.7%, n=138). Students who only wanted distance education were in the minority (8.5%). Twenty-four participants stated that there was no difference (3,9%).

Table 8.

Participants' Teaching Method (Face-to-Face, Distance, Blended) Preference

Teaching Method	n	%
Face-to-face	395	64,9
Hybrid	138	22,7
Distance	52	8,5
Equal (No difference)	24	3,9
Total	609	100

4.7. Participants' Weekly Study Hours

In terms of weekly study hours, it is observed that participants typically spend between 30 minutes and 1 hour. One hundred seventy-eight participants said they allocated 1-2 hours of study time, while 117 said they gave less than 30 minutes. Sixty-seven participants indicated that they spent more than 2 hours. Students typically reported weekly study times of 30 minutes to one hour and 1-2 hours (Table 9).

Table 9.

Participants' Weekly Study Hours

Study Hours	n	%
30 minutes-1 hour	247	40,6
1-2 hours	178	29,2
Less than 30 minutes	117	19,2
More than 2 hours	67	11,0
Total	609	100

4.8. Findings on the Use of Learning Strategies in Distance Education

Analyzing the use of learning strategies in distance education, the scale items were subjected to descriptive analysis according to the factors. The ranking of learning strategies according to their mean scores is given in Table 10.

Table 10.*Use of Learning Strategies in Distance Education*

Learning Strategy	Mean	sd
Complex cognitive strategy use	4.97	1.24
Simple cognitive strategy use	4.81	1.33
Academic thinking	4.79	1.30
Time, resource, and effort management	4.30	1.16
Communication with others	3.82	1.50

According to the means, complex cognitive strategy use has the highest mean. Simple cognitive strategy use, academic thinking, and time, resource, and effort management are the strategies used, respectively. The strategy of communication with others was determined to be the least used strategy compared to the others (Table 10).

4.9. Changes in the Use of Learning Strategies in Distance Education by Gender

Table 11 shows the results of the t-test analyses conducted to determine whether there is a gender difference in using learning strategies.

Table 11.*Changes in the Use of Learning Strategies in Distance Education by Gender*

	Gender	N	X	sd	df	t	P
Complex cognitive strategy use	Male	258	4.85	1.21	1	-2.083	.038
	Female	351	5.06	1.25			
Communication with others	Male	258	3.92	1.46	1	1.458	.145
	Female	351	3.74	1.52			
Time, resource, and effort management	Male	258	4.30	1.20	1	-.152	.879
	Female	351	4.31	1.12			
Simple cognitive strategy use	Male	258	4.60	1.30	1	-3.423	.001
	Female	351	4.97	1.33			
Academic thinking	Male	258	4.79	1.25	1	.049	.961
	Female	351	4.79	1.33			

The table shows that there is a significant difference in the use of complex cognitive strategy ($t=-2.083$, $p<.05$) and simple cognitive strategy ($t=-3.423$, $p<.05$) in terms of gender. It was determined that women were at a higher level than men in both simple and complex cognitive strategy use in distance education.

4.10. Changes in the Use of Learning Strategies in Distance Education by Department

To begin with, the researchers organized the faculties and colleges where the students attend according to the scientific disciplines, keeping in mind that the number of students in each field

was equal to improve the analysis. These units are all made up of undergraduate programs that last at least four years. The grouping was determined as follows:

- One hundred eighteen students are comprised of trainees in the teaching profession from the Faculty of Education.
- Students from the faculties of medicine, veterinary medicine, health sciences, and sports sciences comprise the 117 students health-sports group.
- Students from the faculties of science, engineering and architecture, forestry, and civil aviation school make up the science-technology group (133 students).
- Students from the Fine Arts and Design and Communication faculties make up the 105 students Design-Communication group.
- Students from the faculties of literature, economics and administrative sciences, theology, and tourism make up the social sciences group (136 students).

Table 12 contains the findings of the one-way analysis of variance (ANOVA) carried out to see whether there are variations in the students' learning strategies based on their faculty or field of study.

Table 12.

Changes in the Use of Learning Strategies in Distance Education by Department

	Department	N	X	sd	VS	SS	df	MS	F	P
Complex cognitive strategy use	Education	118	5.15	1.19	B. groups	13.616	4	3.404	2.232	.064
	Health-	117	4.77	1.23	W.	921.188	604	1.525		
	Sport	133	4.90	1.14	groups	934.804	608			
	Science-	105	4.87	1.36	Total					
	Tech.	136	5.13	1.24						
Communication with others	Education	118	3.74	1.51	B. groups	9.717	4	2.429	1.084	.363
	Health-	117	3.71	1.56	W.	1353.039	604	2.240		
	Sport	133	3.83	1.55	groups	1362.756	608			
	Science-	105	4.08	1.36	Total					
	Tech.	136	3.77	1.48						
Time, resource, and effort management	Education	118	4.25	1.05	B. groups	9.652	4	2.413	1.818	.124
	Health-	117	4.11	1.08	W.	801.707	604	1.327		
	Sport	133	4.33	1.17	groups	811.358	608			
	Science-	105	4.30	1.25	Total					
	Tech.	136	4.49	1.20						
Simple cognitive strategy use	Education	118	5.06	1.25	B. groups	17.355	4	4.339	2.478	.043
	Health-	117	4.58	1.24	W.	1057.742	604	1.751		
	Sport	133	4.71	1.33	groups	1075.097	608			
	Science-	105	4.75	1.40	Total					
	Tech.	136	4.93	1.39						
Academic thinking	Education	118	4.87	1.37	B. groups	3.835	4	.959	.566	.687
	Health-	117	4.72	1.26	W.	1023.313	604	1.694		
	Sport	133	4.72	1.21	groups	1027.149	608			
	Science-	105	4.73	1.40	Total					
	Tech.	136	4.89	1.29						
	Design-Com.									
	Social Sci.									

The table shows a difference only in the use of simple cognitive strategies ($F=2.478$, $p<.05$). The use of simple cognitive strategies by the Faculty of Education students was higher than those studying in other fields. Using simple cognitive strategies, students in Education are followed

by those in Social, Design-Communication, and Science-Technology. Students in the area of Health-Sports have the lowest mean in the use of this strategy.

4.11. Changes in the Use of Learning Strategies in Distance Education by Teaching Method Preferences

Students were asked which of the four types of instruction they found most effective. Some students found distance or face-to-face education useful, students found both equally useful, and students found hybrid education useful. Table 13 shows the results of the one-way analysis of variance (ANOVA) conducted to determine if there is a difference in the use of learning strategies based on the teaching method that students find most effective (face-to-face, distance, hybrid, equal).

Table 13.

Changes in the Use of Learning Strategies in Distance Education by Teaching Method Preferences

	Teaching Method	N	X	sd	VS	SS	df	MS	F	P
Complex cognitive strategy use	Face to face	395	4.90	1.29	B. groups	8.388	3	2.796	1.826	.141
	face	52	5.15	1.41	W. groups	926.416	605	1.531		
	Distance	138	5.04	1.01	Total	934.804	608			
	Hybrid	24	5.37	1.08						
	Equal									
Communication with others	Face to face	395	3.77	1.48	B. groups	20.102	3	6.701	3.019	.029
	face	52	4.41	1.60	W. groups	1342.655	605	2.219		
	Distance	138	3.75	1.45	Total	1362.756	608			
	Hybrid	24	3.77	1.62						
	Equal									
Time, resource, and effort management	Face to face	395	4.21	1.17	B. groups	19.997	3	6.666	5.096	.002
	face	52	4.81	1.29	W. groups	791.361	605	1.308		
	Distance	138	4.34	.95	Total	811.358	608			
	Hybrid	24	4.65	1.33						
	Equal									
Simple cognitive strategy use	Face to face	395	4.70	1.38	B. groups	16.204	3	5.401	3.086	.027
	face	52	5.08	1.42	W. groups	1058.893	605	1.750		
	Distance	138	4.94	1.06	Total	1075.097	608			
	Hybrid	24	5.28	1.44						
	Equal									
Academic thinking	Face to face	395	4.74	1.32	B. groups	8.535	3	2.845	1.690	.168
	face	52	5.02	1.33	W. groups	1018.613	605	1.684		
	Distance	138	4.77	1.23	Total	1027.149	608			
	Hybrid	24	5.23	1.23						
	Equal									

Table shows that there is a significant difference in the use of simple cognitive strategies ($F=3.086$, $p<.05$), communication with others ($F=3.019$, $p<.05$), and time, resource and effort

management ($F=5.096$, $p<.05$) factors in the use of learning strategies according to which type of education students find useful. It was observed that students who preferred distance education had higher levels of communication with others and time, resource, and effort management than students who chose face-to-face education, students who preferred hybrid education, and students who considered both equally valuable. In the use of simple cognitive strategies, students who think both types of teaching equally differed significantly from the others.

4.12. Changes in the Use of Learning Strategies in Distance Education by Participation in Extracurricular Activities

Table 14 shows the results of the t-test analyses to determine whether there is a difference in the use of learning strategies between distance education students who participate in extracurricular activities and those who do not.

Table 14.

Changes in the Use of Learning Strategies in Distance Education by Participation in Extracurricular Activities

	Extracurricular Activities	N	X	sd	t	p
Complex cognitive strategy use	Yes	180	5.17	1.17	2.550	.011
	No	429	4.89	1.26		
Communication with others	Yes	180	4.10	1.55	3.046	.002
	No	429	3.70	1.46		
Time, resource, and effort management	Yes	180	4.57	1.18	3.697	.000
	No	429	4.19	1.13		
Simple cognitive strategy use	Yes	180	5.06	1.27	3.023	.003
	No	429	4.70	1.34		
Academic thinking	Yes	180	5.04	1.22	3.072	.002
	No	429	4.67	1.31		

The table shows a difference in the use of all learning strategies regarding participation in extracurricular activities (Complex cognitive strategy use: $t=2.550$, $p<.05$; Communication with others: $t=3.046$, $p<.05$; Time, resource, and effort management: $t=3.697$, $p<.05$; Simple cognitive strategy use: $t=3.023$, $p<.05$; Academic thinking: $t=3.072$, $p<.05$). It was determined that the students who participated in extracurricular activities were significantly higher in all dimensions in the use of learning strategies than those who did not participate.

4.13. Changes in the Use of Learning Strategies in Distance Education by Weekly Study Hours

Table 15 shows the results of a one-way analysis of variance (ANOVA) to see if there is a difference in students' use of learning strategies based on their weekly study hours.

Table 15.

Use of Learning Strategies in Distance Education by Weekly Study Hours

	Weekly Study Hours	N	X	sd	VS	SS	MS	F	P
Complex cognitive strategy use	<30 min.	117	4.45	1.36	B. groups	53.539	17.846	12.233	.000
	30 min-1 hours	247	4.93	1.20	W. groups	881.128	1.459		
	1-2 hours	178	5.27	1.07	Total	934.667			
	> 2 hours	66	5.23	1.24					
Communication with others	<30 min.	117	3.30	1.54	B. groups	56.685	18.895	8.740	.000
	30 min-1 hours	247	3.80	1.36	W. groups	1305.747	2.162		
	1-2 hours	178	3.97	1.54	Total	1362.432			
	> 2 hours	66	4.39	1.53					
Time, resource, and effort management	<30 min.	117	3.60	1.17	B. groups	108.822	36.274	31.187	.000
	30 min-1 hours	247	4.19	1.09	W. groups	702.527	1.163		
	1-2 hours	178	4.75	.99	Total	811.349			
	> 2 hours	66	4.74	1.09					
Simple cognitive strategy use	<30 min.	117	4.01	1.44	B. groups	127.165	42.388	27.014	.000
	30 min-1 hours	247	4.74	1.28	W. groups	947.763	1.569		
	1-2 hours	178	5.22	1.09	Total	1074.928			
	> 2 hours	66	5.38	1.19					
Academic thinking	<30 min.	117	4.25	1.38	B. groups	57.859	19.286	12.020	.000
	30 min-1 hours	247	4.74	1.29	W. groups	969.122	1.605		
	1-2 hours	178	5.06	1.16	Total	1026.981			
	> 2 hours	66	5.20	1.26					

The table shows a significant difference in the use of all learning strategies (Complex cognitive strategy use: $F=12.233$, $p<.05$; Communication with others: $F=8.740$, $p<.05$; Time, resource, and effort management: $F=31.187$, $p<.05$; Simple cognitive strategy use: $F=27.014$, $p<.05$; Academic thinking: $F=12.020$, $p<.05$). In complex cognitive strategy use and time, resource and effort management strategies, students who studied between 1-2 hours per week were significantly different from other students, while in simple cognitive strategy use, communication with

others and academic thinking strategies, students who studied more than 2 hours per week were at a higher level than other groups.

5. Discussion and Conclusion

When the student's demographic data is analyzed, it is discovered that the gender distribution is similar. The distribution of the department/field of study shows that there are participants from practically all of the university's four-year undergraduate fields. The great majority of students do not participate in extracurricular activities. This condition is consistent with research that found that when individual effort and responsibility increased in distance education, even if these tasks were met, not much time was dedicated to other activities (Aguilera-Hermida, 2020; Kara, 2022). Students answered that the most significant aspects of distance education are live lectures, course materials, and engagement. This information is consistent with earlier research (Afşar & Büyükdogan, 2020; Hotar et al., 2021; Karatepe et al., 2020). The courses are mostly studied on smartphones and personal computers, with internet access provided by ADSL or mobile data at home. When we look at the teaching method preferences of students, we can find that they favor face-to-face education the most. As indicated below, there are variances in the application of learning strategies in this sense.

The most prominent complex cognitive strategy in the use of learning strategies in the distance education process is the use of cognitive strategies. In online learning environments, students try to gain academic skills in attempting to gain self-regulation skills. This returns to the student as more responsibility than in face-to-face environments (Wandler & Imbriale, 2017; Zimmerman, 2002). Although there are even instant interaction opportunities in distance education environments, the fact that they are not used as in face-to-face settings, or their use remains limited, requires more responsibility and self-discipline for effective learning (Aslan, 2006). For this reason, the learner's efforts are also important in using learning strategies (Küçük, 2010). For example, a study on the use of motivational strategies in distance education with high school students determined that distance education increased students' responsibilities and forced them to use cognitive strategies (Gür, 2022). In parallel with the literature, it is thought that the higher level of complex cognitive strategy use than other strategies is related to the fact that distance education imposes more responsibility on students than face-to-face education.

Although there is no difference in the use of other learning strategies, it is seen that female students are at a higher level than male students in the use of simple and complex cognitive strategies. In distance education programs, female students are at a higher level of self-regulation and cognitive strategy use than male students (Gür, 2022), and female students use learning strategies at a higher level than male students (Başarıcı, 2012). Similarly, in field-based approaches, female students were found to be at higher levels than male students in grammar learning strategies (Zarrinabadi et al., 2021), mathematics learning strategies (Degol et al., 2018) and self-efficacy studies (Diseth et al., 2014). In parallel with these studies in the literature, it is seen that female students have a higher level of cognitive strategy use in distance education than male students.

It was seen that students differed only in the use of simple cognitive strategy according to the faculty/field they studied. Faculty of Education students were found to be at a significantly higher level than the others in using this learning strategy. There is no precise study in the literature to distinguish the students of the Faculty of Education from the students of other fields in the use of these strategies. However, this may indicate that students directly involved in the curriculum, which has comprehensive content on learning and teaching, such as Teaching Principles and Methods, Teaching Methods and Techniques, and Psychology of Learning, are better at using learning strategies than others. In a study examining the effect of teaching strategies on the use of learning strategies, it was stated that teaching strategies affect the number and type of learning strategies used by students (Karakoç & Şimşek, 2004). Therefore, it can be said that pre-service teacher students have higher means in the use of simple cognitive strategies.

Most of the participants (64.6%) stated that they preferred face-to-face education. The scores of the students who chose distance education (22%) on the sub-dimensions of "communication with others" and "time, resource, and effort management" strategies were significantly higher than the scores of other students. Due to the lack of social communication in the absence of a face-to-face education environment (Aydemir, 2021; Batur, 2022; İşman, 2011;), it is inevitable for those who prefer distance education to use communication strategies with others. Similarly, the high use of these strategies in distance education, independent of time and resources and dependent on responsibility and effort (İşman, 2011), is an expected result. Using simple cognitive strategies, the means of the students who saw both types of education at equal value

were higher than the others. While there is no research for this data, the fact that a student who does not particularly prefer face-to-face or distance education is higher in the use of simple cognitive strategies than those who prefer one type of instruction may be significant in terms of showing that strategy use does not depend on a preference.

It is seen that students who stated that they participated in extracurricular activities in the distance education process were at a higher level in the use of all learning strategies than those who did not. This shows that students who do not limit themselves to course activities are at an advanced level in strategy use as expected if responsibility is at the forefront in the distance education process. This result is in line with previous studies. It is seen that those who engage in different activities are at a better level in self-regulation and cognitive strategy use (Gür, 2022), and students who prioritize responsibility in different learning domain strategies are at a higher level (Degol et al., 2018).

Considering the weekly study hours, the students who work for 1-2 hours and more than 2 hours differ significantly from those who work for less time in the dimensions of using learning strategies. It has been observed that as the weekly study time increases, pre-service teachers' learning strategies also increase (Yıldızlar, 2012). This is in line with the study's results, showing that students who spend more time studying in distance education use learning strategies more.

This study aimed to develop the Turkish adaptation of the MSLQ-B DE and provide a valid and reliable assessment tool for assessing learning strategies in distance education. Furthermore, the utilization of learning strategies within a selected group in Turkey was assessed by implementing this scale. Measuring the utilization of learning strategies is crucial for the efficacy of online education. Thus, the adapted scale is considered an essential metric for academic research and professionals in distance education.

6. Recommendations

For further studies

- The use of learning strategies by various sample groups can be examined using this adapted scale.

- Conducting comparative studies between this scale and other scales to assess the use of learning strategies in online education could make a valuable contribution.
- Conducting studies that thoroughly examine the correlation between the use of learning strategies and variables such as meaningful learning, academic achievement, self-efficacy, and effort management might be beneficial.
- Qualitative data analysis on key factors acquired from a study can strengthen data variety.

For practitioners

- The level of communication with others needed to be improved. Therefore, it is necessary to prioritize collaborative strategies that facilitate learners' communication in distant education settings.
- Individuals who engaged in extracurricular activities exhibited elevated average scores across all sub-factors. This indicates that there is a need to enhance extracurricular activities in order to strengthen learning processes. Furthermore, augmenting extracurricular activities can be advantageous in reinforcing the sub-factor of communication with others.

7. Limitations

The selection of participants from a single university with a convenient sampling method is one of the limitations of this study. This study analyzed the scale adaption and data from a sample group. However, due to the word constraint, the analysis of key factors was limited to a descriptive level.

8. References

- Afşar, B., & Büyükdoğan, B. (2020). Covid-19 pandemisi döneminde İİBF ve SBBF öğrencilerinin uzaktan eğitim hakkındaki değerlendirmeleri. *Karatay Sosyal Araştırmalar Dergisi*, (5), 161-182.
- Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open*, 1, 100011. . <https://doi.org/10.1016/j.ijedro.2020.100011>
- Al-Qahtani, M. F. (2013). Relationship between English language, learning strategies, attitudes, motivation, and students' academic achievement. *Education in Medicine Journal*, 5(3). . <https://doi.org/10.5959/eimj.v5i3.124>

- Alexander, P. A., Graham, S., & Harris, K. R. (1998). A perspective on strategy research: Progress and prospects. *Educational Psychology Review*, 10, 129-154.
- Allen, I. E., & Seaman, J. (2017). *Digital Compass Learning: Distance Education Enrollment Report 2017*. Babson survey research group. <https://eric.ed.gov/?id=ed580868>.
- Alkan, C. (1987). Açıköğretim "Uzaktan Eğitim Sistemlerinin Karşılaştırmalı Olarak İncelenmesi". *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Yayınları*, 157.
- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology*, 80(3), 260. <https://doi.org/10.1037/0022-0663.80.3.260>
- Anthonyamy, L. Koo, A.C., & Hew, S.H. (2020). Self-regulated learning strategies in higher education: Fostering digital literacy for sustainable lifelong learning. *Education Information Technologies*, 25, 2393–2414. . <https://doi.org/10.1007/s10639-020-10201-8>.
- Artino, A. R. & Stephens, J. M. (2009). Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online. *Internet and Higher Education*, 12, 146–151. <https://doi.org/10.1016/j.iheduc.2009.02.001>
- Aslan, Ö. (2006). Öğrenmenin yeni yolu: E-Öğrenme. *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 16(2), 121-131.
- Ates, H., & Alsar, K. (2012). The importance of lifelong learning has been increasing. *Procedia-Social and Behavioral Sciences*, 46, 4092-4096. <https://doi.org/10.1016/j.sbspro.2012.06.205>
- Aydemir, A. (2021). Uzaktan eğitim sürecinde öğretmen ile öğrenci-veli iletişimi: Sosyal bilgiler öğretmenlerinin deneyimleri. *MANAS Sosyal Araştırmalar Dergisi*, 10(2), 813-827. <https://doi.org/10.33206/mjss.824033>
- Azevedo, R. (2009). Theoretical, conceptual, methodological, and instructional issues in research on metacognition and self-regulated learning: A discussion. *Metacognition and Learning*, 4, 87-95. <https://doi.org/10.1007/s11409-009-9035-7>
- Bağrıacık Yılmaz, A., & Karataş, S. (2022). Why do open and distance education students drop out? Views from various stakeholders. *International Journal of Educational Technology in Higher Education*, 19(1), 1-22. <https://doi.org/10.1186/s41239-022-00333-x>
- Bakar, M. A. A., & Ismail, N. (2020). Mathematical instructional: a conceptual of redesign of active learning with metacognitive regulation strategy. *International Journal of Instruction*, 13(3), 633-648. <https://doi.org/10.29333/iji.2020.13343a>
- Bannert, M., & Reimann, P. (2012). Supporting self-regulated hypermedia learning through prompts. *Instructional Science*, 40, 193-211. <https://doi.org/10.1007/s11251-011-9167-4>
- Başarıcı, R. (2012). *İnternet Tabanlı Uzaktan Eğitim Programlarında Öğrenme Stratejileri Kullanımı* (Yayımlanmamış Yüksek Lisans Tezi). Marmara Üniversitesi.
- Batur, M. (2022). Yeni iletişim teknolojileri çerçevesinde uzaktan eğitimde iletişim ve etkileşim. *Sosyal Bilimler Araştırmaları Dergisi*, 12(2), 1501-1518. <https://doi.org/10.48146/odusobiad.1119448>
- Bernt, F. M., & Bugbee, A. C. (1993). Study practices and attitudes related to academic success in a distance learning programme. *Distance Education*, 14(1), 97-112. <https://doi.org/10.1080/0158791930140108>

- Bilgiç, H. G., & Tüzün, H. (2020). Issues and challenges with web-based distance education programs in Turkish Higher Education Institutes. *Turkish Online Journal of Distance Education*, 21(1), 143-164. <https://doi.org/10.17718/tojde.690385>
- Bol, L., & Garner, J. K. (2011). Challenges in supporting self-regulation in distance education environments. *Journal of Computing in Higher Education*, 23, 104-123. <https://doi.org/10.1007/s12528-011-9046-7>
- Bozkurt, A. (2019). From distance education to open and distance learning: A holistic evaluation of history, definitions, and theories. S Şişman-Uğur and G Kurubacak (Eds). In *Handbook of Research on Learning in the Age of Transhumanism* (pp. 252-273). IGI Global. <https://doi.org/10.4018/978-1-5225-8431-5.ch016>
- Breslow, L., Pritchard, D. E., DeBoer, J., Stump, G. S., Ho, A. D., & Seaton, D. T. (2013). Studying learning in the worldwide classroom research into edX's first MOOC. *Research & Practice in Assessment*, 8, 13-25.
- Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education*, 27, 1-13. <https://doi.org/10.1016/j.iheduc.2015.04.007>
- Broadbent, J. (2017). Comparing online and blended learner's self-regulated learning strategies and academic performance. *International Higher Education*, 33, 24–32. <https://doi.org/10.1016/j.iheduc.2017.01.004>
- Burns, M. (2023). *Distance Education for Teacher Training: Modes, Models and Methods (2nd Edition)*. Education Development Center.
- Cera, R., Mancini, M., & Antonietti, A. (2013). Relationship between metacognition, self-efficacy and self-regulation in learning. *ECPS-Journal*, 7, 2013. <https://doi.org/10.7358/ecps-2013-007-cera>
- Clarizia, F., De Santo, M., Lombardi, M., & Santaniello, D. (2021). E-learning and industry 4.0: A chatbot for training employees. In *Proceedings of Fifth International Congress on Information and Communication Technology: ICICT 2020*, London, Volume 2 (pp. 445-453). Springer. DOI:10.1007/978-981-15-5859-7_44
- Cook, E., Kennedy, E., & McGuire, S. Y. (2013). Effect of teaching metacognitive learning strategies on performance in general chemistry courses. *Journal of Chemical Education*, 90(8), 961-967. <https://doi.org/10.1021/ed300686h>
- Corner, S. (2009). Choosing the right type of rotation in PCA and EFA. *JALT Testing & Evaluation SIG Newsletter*, 13(3), 20-25.
- Credé, M., & Phillips, L. A. (2011). A Meta-analytic review of the Motivated Strategies for Learning Questionnaire. *Learning and Individual Differences*, 21, 337–346. <https://doi.org/10.1016/j.lindif.2011.03.002>
- Creswell, J. (2013). *Research design: qualitative, quantitative, and mixed methods approach*. Sage.
- Dabbagh, N. & Kitsantas, A. (2004). Supporting Self-Regulation in Student-Centered Web-Based Learning Environments. *International Journal on E-Learning*, 3(1), 40-47. Association for the Advancement of Computing in Education (AACE). Retrieved from <https://www.learntechlib.org/primary/p/4104/>.

- Degol, J. L., Wang, M. T., Zhang, Y., & Allerton, J. (2018). Do growth mindsets in Math benefit females? Identifying pathways between gender, mindset, and motivation. *Journal of Youth and Adolescence*, 47(5), 976–990. <https://doi.org/10.1007/s10964-017-0739-8>
- Dhanarajan, G. (2001) Distance education: Promise, performance and potential. *Open learning: The Journal of Open, Distance and e-Learning*, 16(1), 61-68. <https://doi.org/10.1080/02680510124465>
- Diseth, Å, Meland, E., & Breidablik, H. J. (2014). Self-beliefs among students: Grade level and gender differences in self-esteem, self-efficacy and implicit theories of intelligence. *Learning and Individual Differences*, 35, 1–8. DOI:10.1016/j.lindif.2014.06.003
- Donker, A. S., De Boer, H., Kostons, D., Van Ewijk, C. D., & Van der Werf, M. P. (2014). Effectiveness of learning strategy instruction on academic performance: A meta-analysis. *Educational Research Review*, 11, 1-26. <https://doi.org/10.1016/j.edurev.2013.11.002>
- Duncan, T. G., & McKeachie, W. J. (2005). The making of the Motivated Strategies for Learning Questionnaire. *Educational Psychologist*, 40, 117–128. https://doi.org/10.1207/s15326985ep4002_6
- Edisherashvili, N., Saks, K., Pedaste, M., & Leijen, Ä. (2022). Supporting self-regulated learning in distance learning contexts at higher education level: Systematic literature review. *Frontiers in Psychology*, 12, 792422. <https://doi.org/10.3389/fpsyg.2021.792422>
- El-Adl, A., & Alkharusi, H. (2020). Relationships between self-regulated learning strategies, learning motivation and mathematics achievement. *Cypriot Journal of Educational Sciences*, 15(1), 104-111. <https://doi.org/10.18844/cjes.v15i1.4461>
- Ergen, B., & Kanadli, S. (2017). The effect of self-regulated learning strategies on academic achievement: A meta-analysis study. *Eurasian Journal of Educational Research*, 17(69), 55-74. <https://doi.org/10.14689/ejer.2017.69.4>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Filcher, C., & Miller, G. (2000). Learning strategies for distance education students. *Journal of Agricultural Education*, 41(1), 60-68. <https://doi.org/10.5032/jae.2000.01060>
- Goverover, Y., Basso, M., Wood, H., Chiaravalloti, N., & DeLuca, J. (2011). Examining the benefits of combining two learning strategies on recall of functional information in persons with multiple sclerosis. *Multiple Sclerosis Journal*, 17(12), 1488-1497. <https://doi.org/10.1177/1352458511406310>
- Gür, T. (2022). *Uzaktan Eğitimin Ergenlerde Akademik Kendini Düzenleme, Motivasyonel Stratejiler Kullanma Becerileri ve Akademik Başarı ile İlişkinin İncelenmesi* (Yayımlanmamış Yüksek Lisans Tezi). Hacettepe Üniversitesi.
- Hayat, A. A., & Shateri, K. (2019). The role of academic self-efficacy in improving students' metacognitive learning strategies. *Journal of Advances in Medical Education & Professionalism*, 7(4), 205. <https://doi.org/10.30476/jamp.2019.81200>
- Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research*, 66(2), 99-136. <https://doi.org/10.2307/1170605>

- Hotar, N., Özcan, M. A., Baran, B., Yacı, Ş. N., & Karagöz, E. (2021). Acil uzaktan eğitimden ne öğrendik? Öğrenci ve öğretim elemanı görüşlerinin karşılaştırılması. *Batı Anadolu Eğitim Bilimleri Dergisi*, 12(2), 673-690. <https://doi.org/10.51460/baebd.986090>
- İşman, A. (2011). *Uzaktan Eğitim (4.baskı)*. Pegem.
- Jamaluddin, N. S., Kadir, S. A., Alias, S. N., & Abdullah, A. (2021). A review of psychosocial learning environment. *International Journal of Academic Research in Progressive Education and Development*, 10(3), 801-805. DOI:10.6007/IJARPED/v10-i3/11189
- Jin, S. H., Im, K., Yoo, M., Roll, I., & Seo, K. (2023). Supporting students' self-regulated learning in online learning using artificial intelligence applications. *International Journal of Educational Technology in Higher Education*, (20), 32. <https://doi.org/10.1186/s41239-023-00406-5>
- Kara, C. (2022). Uzaktan eğitim avantajlarının pandemi sonrası uygulamalı grafik tasarım derslerine entegrasyonu. *The Journal of Open Learning and Distance Education (JOLDE)*, 1(1), 18-34.
- Karakoç, Ş. & Şimşek, N. (2004). Öğretme stratejilerinin öğrenme stratejileri kullanımına etkisi. *Kuram ve Uygulamada Eğitim Bilimleri*, 4(1), 99-121.
- Karaoğlan Yılmaz, F. G., Olpak, Y. Z., & Yılmaz, R. (2018). The effect of the metacognitive support via pedagogical agent on self-regulation skills. *Journal of Educational Computing Research*, 56(2), 159-180. <https://doi.org/10.1177/073563311770>
- Karasar, N. (2015). *Bilimsel araştırma yöntemleri*. Nobel.
- Karatepe, F., Küçükgençay, N., & Peker, B. (2020). Öğretmen adayları senkron uzaktan eğitime nasıl bakıyor? Bir anket çalışması. *Journal of Social and Humanities Sciences Research*, 7(53), 1262-1274. <https://doi.org/10.26450/jshsr.1868>
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & Education*, 104, 18-33. <https://doi.org/10.1016/j.compedu.2016.10.001>
- Küçük, M. (2010). *Çevrimiçi Öğrenenlerin Öğrenme Biçimi, Öğrenme Stratejileri ve Eşzamansız Tartışmalara Katılımları Arasındaki İlişki*, (Yayımlanmamış Doktora Tezi), Anadolu Üniversitesi.
- Kyndt, E., Govaerts, N., Dochy, F., & Baert, H. (2011). The learning intention of low-qualified employees: A key for participation in lifelong learning and continuous training. *Vocations and Learning*, 4, 211-229. DOI:10.1007/s12186-011-9058-5
- Lazakidou, G., & Retalis, S. (2010). Using computer supported collaborative learning strategies for helping students acquire self-regulated problem-solving skills in mathematics. *Computers & Education*, 54(1), 3-13. <https://doi.org/10.1016/j.compedu.2009.02.020>
- Leutwyler, B. (2009). Metacognitive learning strategies: Differential development patterns in high school. *Metacognition and Learning*, 4(2), 111-123. <https://doi.org/https://doi.org/10.1007/s11409-009-9037-5>
- Lin, C. H., Zhang, Y., & Zheng, B. (2017). The roles of learning strategies and motivation in online language learning: A structural equation modeling analysis. *Computers & Education*, 113, 75-85. <https://doi.org/10.1016/j.compedu.2017.05.014>

- Mayer, R. E. (1988). Learning strategies: An overview. *Learning and study strategies*, 11-22. <https://doi.org/10.1016/B978-0-12-742460-6.50008-6>
- McKeachie, W. J. (1988). The need for study strategy training, CE Weinstein, ET Goetz, and PA Alexander (Eds). In *Learning and study strategies* (pp. 3-9). Academic Press. <https://doi.org/10.1016/B978-0-12-742460-6.50007-4>
- McKeachie, W. J., Pintrich, P.R., Lin, Y., & Smith, D. (1986). *Teaching and learning in the college classroom: A review of the research literature*. National Center for Research to Improve Postsecondary Teaching and Learning, University of Michigan. <https://files.eric.ed.gov/fulltext/ED314999.pdf> from retrieved.
- Martins, L. B., & Zerbin, T. (2014). Distance learning in higher education institutions: a review of the research. *Revista Psicologia Organizações e Trabalho*, 14(3), 271-282.
- Meijs, C., Neroni, J., Gijsselaers, H. J., Leontjevas, R., Kirschner, P. A., & De Groot, R. H. (2019). Motivated strategies for learning questionnaire part B revisited: New subscales for an adult distance education setting. *The Internet and Higher Education*, 40, 1-11. <https://doi.org/10.1016/j.iheduc.2018.09.003>
- Mitsea, E., & Drigas, A. (2019). A Journey into the metacognitive learning strategies. *International Journal of Online & Biomedical Engineering*, 15(14). <https://doi.org/10.3991/ijoe.v15i14.11379>
- Morgan, A. R. (1995). Improving student learning in distance education: Theory, research and practice. *European Journal of Psychology of Education*, 10, 121-130. <https://doi.org/10.1007/BF03172910>
- Morgan, C. J., Dingsdag, D., & Saenger, H. (1998). Learning strategies for distance learners: Do they help? *Distance Education*, 19(1), 142-156. <https://doi.org/10.1080/0158791980190110>
- Murayama, K., Pekrun, R., Lichtenfeld, S., & Vom Hofe, R. (2013). Predicting long-term growth in students' mathematics achievement: The unique contributions of motivation and cognitive strategies. *Child Development*, 84(4), 1475-1490. <https://doi.org/10.1111/cdev.12036>
- Neroni, J., Meijs, C., Gijsselaers, H. J., Kirschner, P. A., & De Groot, R. H. (2019). Learning strategies and academic performance in distance education. *Learning and Individual Differences*, 73, 1-7. <https://doi.org/10.1016/j.lindif.2019.04.007>
- Nota, L., Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: A longitudinal study. *International Journal of Educational Research*, 41(3), 198-215. <https://doi.org/10.1016/j.ijer.2005.07.001>
- Orçan, F. (2018). Exploratory and confirmatory factor analysis: which one to use first? *Journal of Measurement and Evaluation in Education and Psychology*, 9(4), 413-421. <https://doi.org/10.21031/epod.394323>
- Orhan, F. (2007). Applying self-regulated learning strategies in a blended learning instruction. *World Applied Sciences Journal*, 2(2), 390-398.
- Pintrich, P. R., Smith, D. A. F., García, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53, 801-813. <https://doi.org/10.1177/001316449305300302>

- Puteh, M., & Ibrahim, M. (2010). The usage of self-regulated learning strategies among form four students in the mathematical problem-solving context: A case study. *Procedia-Social and Behavioral Sciences*, 8, 446-452. <https://doi.org/10.1016/j.sbspro.2010.12.061>
- Rachal, K.C., Daigle, S., & Rachal, W.S. (2007). Learning problems reported by college students: Are they using learning strategies? *Journal of Instructional Psychology*, 34 (4), 191-200.
- Sankaran, S. R., & Bui, T. (2001). Impact of learning strategies and motivation on performance: A study in web-based instruction. *Journal of Instructional psychology*, 28(3), 191-198.
- Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research Group. <https://www.bayviewanalytics.com/reports/gradeincrease.pdf> from retrieved.
- Simonson, M., Smaldino, S. & Zvacek, S. M., (2015). *Teaching and learning at a distance: Foundations of distance education (6th edition)*. Information Age.
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475. <https://doi.org/10.1006/ceps.1994.1033>
- Schnaubert, L., & Herold, B. (2020). Social-distance education: Struggling with cognition, emotion or motivation during SRL? In *ICCE-Int. Conf. Comput. Educ., Proc.* (pp. 7-13). <https://apsce.net/icce/icce2020/proceedings/W1-13/W1/ICCE2020-Proceedings-Vol2-2.pdf> from retrieved.
- Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational psychologist*, 40(2), 85-94. https://doi.org/10.1207/s15326985ep4002_3
- Shih, C. C., & Gamon, J. A. (2001). Web-based learning: Relationships among student motivation, attitude, learning styles, and achievement. *Journal of Agricultural Education*, 42(4), 12-20. DOI:10.5032/jae.2001.04012
- Sousa, V. D., & Rojjanasrirat, W. (2011). Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. *Journal of Evaluation in Clinical Practice*, 17(2), 268-274. <https://doi.org/10.1111/j.1365-2753.2010.01434.x>
- Sperber, A. D. (2004). Translation and validation of study instruments for cross-cultural research. *Gastroenterology*, 126, 124-128. 10.1053/j.gastro.2003.10.016
- Tarricone, P. (2011). *The taxonomy of metacognition*. Psychology Press. <https://doi.org/10.4324/9780203830529>
- Van Hout-Wolters, B. H. A. M. (2009). Measuring learning strategies kinds of measurement methods and their usefulness in educational research and practice. *Pedagogische Studiën*, 86(2), 110-129.
- Wandler, J. & Imbriale, W. (2017). Promoting undergraduate student self-regulation in online learning environments. *Online Learning*, 21(2), 1-16. <https://doi.org/10.24059/olj.v21i2.881>
- Wegner, C., Minnaert, L., & Strehlke, F. (2013). The importance of learning strategies and how the Project "kolumbus-kids" promotes them successfully. *European Journal of Science and Mathematics Education*, 1(3), 137-143. DOI:10.30935/scimath/9393
- Weinstein, C. E., Palmer, D., & Schulte, A. C. (1987). Learning and study strategies inventory (LASSI). H & H Publishing.

- Weinstein, C.E. & Mayer, R.W. (1986). The Teaching of Learning Strategies, M Wittrock (Eds.). In *Handbook of Research on Teaching* (pp. 315 - 327). Macmillan.
- Winn, A. S., DelSignore, L., Marcus, C., Chiel, L., Freiman, E., Stafford, D., & Newman, L. (2019). Applying cognitive learning strategies to enhance learning and retention in clinical teaching settings. *MedEdPORTAL*, 15, 10850. DOI:10.15766/mep_2374-8265.10850
- Weinstein, C. E., & Underwood, V. L. (1985). Learning strategies: The how of learning, J. Segal, S. Chipman, & R. Glaser (Eds.). In *Relating instruction to basic research* (pp. 265-274). Lawrence Erlbaum.
- Weinstein, C. E., Husman, J., & Dierking, D. R. (2000). Self-regulation interventions with a focus on learning strategies, M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.). In *Handbook of self-regulation* (pp. 727-747). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50051-2>
- Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency. *Learning, Media and Technology*, 45(2), 107-114. DOI:10.1080/17439884.2020.1761641
- Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, 34(6), 806-838. <https://doi.org/10.1177/0011000006288127>
- Zarrinabadi, N., Rezazadeh, M., & Chehrazi, A. (2021). The links between grammar learning strategies and language mindsets among L2 and L3 learners: Examining the role of gender. *International Journal of Multilingualism*, 1-18. <https://doi.org/10.1080/14790718.2020.1871356>
- Zhao, H., Chen, L., & Panda, S. (2014). Self-regulated learning ability of Chinese distance learners. *British Journal of Educational Technology*, 45(5), 941-958. DOI:10.1111/bjet.12118
- Zhou, Y., & Wang, J. (2021). Psychometric Properties of the MSLQ-B for adult distance education in China. *Frontiers in Psychology*, 12, 620564. <https://doi.org/10.3389/fpsyg.2021.620564>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70. https://doi.org/10.1207/s15430421tip4102_2
- Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and prospects. *American Educational Research Journal*, 45(1), 166-183. DOI:10.3102/0002831207312909
- Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychologist*, 48(3), 135-147. <https://doi.org/10.1080/00461520.2013.794676>