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A research on online self-regulated learning skills of pre-service Turkish teachers

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Highlights

- This research emphasizes the importance of self-regulated learning
- This research draws attention to the importance of self-regulation skills in online learning.
- This research reflects the self-regulation skills of pre-service teachers who will be role models for students in the future.

Article Info: Research Article

Keywords: *online learning, self-regulated learning, pre-service Turkish teachers*

Abstract

With online learning being on the agenda again in higher education, university students had different views about the online learning process. While some students evaluated this process as an advantage, others expressed the difficulties of the process. There are reasons, such as students' ability to organize their learning processes and being aware of their capacities under these different views. It was observed that students possessing such skills implement various strategies during the learning process and adapt it to their needs. Self-regulation is a prerequisite for a successful learning process and emphasizes the learner's autonomy and personal preferences. Self-regulation skills have become more noteworthy, especially in the online learning process, where students become passive recipients. While students who have developed self-regulation skills in the online learning process are successful, students who do not have this skill are more disadvantaged. Therefore, in this process, we come across two opposite groups, those who turn online learning into an advantage and those who cannot manage this process. This study aimed to assess the self-regulated learning skills of pre-service Turkish teachers who underwent online learning. This study was designed according to the descriptive survey method and was limited to 1st, 2nd, 3rd, and 4th-grade students in the Department of Turkish Language Teaching. In this study, Online Self-Regulated Learning Scale used developed by Barnard et al. (2008) and adopted into Turkish by Samsa Yetik (2011). The obtained data were analyzed with the IBM SPSS Statistics 25 program. This study found that pre-service teachers' online self-regulation skills differed depending on their previous experience with distance education. Significant differences were found in different sub-dimensions of pre-service teachers' online self-regulation skills based on synchronous or asynchronous attendance in distance education courses.

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1. Introduction

In the 21st century world, where learning is not limited to school but covers the whole life, the concept of "learning to learn" becomes the focus. In order to learn to learn, it is significant for individuals to know themselves first, to be aware of their interests, abilities, developed aspects, and aspects that need to be developed. It would not be wrong to see a person, who recognizes their characteristics, gain a significant achievement in learning to learn. In today's world, where lifelong learning has critical importance, an individual who can determine the path to follow in the learning process, and who can manage, control, and evaluate the process, has self-regulated learning skills.

Self-regulation is generally regarded as a multidimensional construct that includes cognitive, metacognitive, behavioral, and motivational elements. Self-regulation, seen as the key to motivation in learning, encourages individuals to plan, evaluate and manage their behaviors and cognition to achieve the desired goal (Yossatorn, Binali, Weng & Awuor, 2022).

The concept of self-regulated learning can express as the individual's planning and conducting one's learning journey in the learning process, managing this process, and taking all responsibilities. In short, it can define as students being responsible for their learning processes. Students' motivation towards learning plays a significant role in the improvement of self-regulation skills. Overall, interest in student self-regulated learning stemmed from broader attempts to explore human self-control during the 1970s and early 1980s (Yigletu, Michael & Atnafu, 2023). It emphasized that self-regulated learning is one of the main factors explaining individual learning and performance differences for a long time. (Han, DiGiacomo & Usher, 2023).

Shunk and Zimmerman (2007) define self-regulated learning as learning that originates from the thoughts and behaviors students systematically create for their learning goals. Self-regulated learning refers to the self-directed process in which students use their cognitive abilities to achieve successful academic performance by themselves (Zimmerman, 2008). Self-regulated learners plan, organize, monitor, and evaluate themselves and set goals for themselves at various points during the acquisition process (Zimmerman, 1990).

Online learning is a process that requires a high degree of participation and regular follow-up of students. Online learning is largely based on the autonomous and active participation of learners. This brings to mind self-regulated learning. Learning in online learning environments is imperative, while encouraging students' self-regulation. It is difficult for students to acquire adequate self-regulation skills in a limited time frame (Song & Kim, 2021). Elements such as the physical absence of the teacher in the online environment, the independence of time and space, and the flexible structure of the environment make it necessary for students to have self-regulated learning skills. In the current conditions of the world we live in and our country, it is crucial for students to acquire self-regulated learning skills. Distance education and online learning in universities have come to the fore again, especially during the Covid 19 epidemic in the world in recent years and due to the earthquakes in our country on February 6, 2023.

The aim of this research is to assess the online self-regulated learning skills of pre-service Turkish teachers. Studies on self-regulated learning skills in online environments are limited and mostly focus on formal education students taking face-to-face courses, according to the existing literature. Additionally, no research has been found in the literature examining the self-regulated learning skills of pre-service Turkish teachers in online environments. In this respect, it is anticipated that the research will fill the gap in the field.

2. Literature

Self-regulated learning has been widely accepted as personal goals as an individual trait that includes a cyclical harmony of thoughts, feelings, and actions in achieving personal goals (Beishuizen, 2008). Students' self-regulation during learning requires independent metacognitive strategic action fueled by students' intrinsic motivations. Accordingly, the active participation of students and their pursuit of achieving these goals by monitoring, regulating, and controlling their cognition, motivation, and general

learning behaviors are significant in determining learning goals. This situation can be summarized as a combination of skill and will (Perry, 2002).

Conceptualized self-regulation consists of three phases: foresight, performance control, and self-reflection. The foresight phase, which precedes actual performance, refers to processes that form the basis for action, such as goal setting and modeling. The performance control stage includes processes such as social comparisons, feedback, and the use of learning strategies, and these processes occur during learning and affect attention and action. In the self-reflection phase, which takes place after the performance, students respond to their efforts by evaluating progress on their goals and adjusting strategies as needed (Zimmerman, 1998; cited in Shunk and Zimmerman, 2007).

Based on Bandura's social cognitive approach, Zimmerman and Schunk (2007) formulated a social cognitive model of self-regulation development. This model assumes four developmental stages that begin with social resources and then move on to self-resources: observation, emulation, self-control, and self-regulation. The observation stage includes the acquisition of cognitive skills from modeled and verbal command, the imitation stage, the demonstration of cognitive ability with social guidance and feedback, the self-control stage, the internalization and independent demonstration of the skill, the self-regulation stage, the adaptation of the skills to changes in personal and contextual conditions. Even if there is some overlap, the first two stages (observational, imitation) are mainly based on social factors, while the other two stages (self-controlled, self-regulated) are dependent on student influence. The level of emulation is reached when the learner's performance approaches the general form of the model. The student does not copy the model's actions, but instead imitates the model's overall pattern or style. The major difference between the first two is that observational learning only involves acquisition at the observational level, while emulated learning also includes a performance ability. These two resources are primarily social because they require students' exposure to models. Internalization of the skill or strategy being learned (learner control) has begun, but the process escalates primarily with the transition to the third and fourth resources included in the learnings. The third, self-control level represents students' ability to use skill or strategy independently while performing related tasks. At this stage, the skill or strategy is internalized (self-control), but the student's mental representation becomes finalized after the model's performance. At the self-regulated final level, students adapt their skills and strategies to changes in personal and contextual circumstances. Students can now begin to use skills and strategies, make adjustments based on situational characteristics, and remain motivated through personal goals and a sense of self-efficacy to achieve them.

Upon reviewing the literature, online self-regulated learning is acknowledged as a fundamental component of self-regulated learning (Yu & Zhou, 2022). Three types of self-regulation are known to be effective for successful learning experiences in online learning: between student and content, between student and instructor, and between student and student (Cho, Cheon & Lim, 2021). In order to succeed in online learning, students must take responsibility for their engagement with course content by logging into the lesson management system on the first day of assignments to plan ahead. After creating a plan for achieving goals, online students should take action, regularly checking their progress and assessing their level of achievement of their goals. To be successful in the interaction between student and instructor, online students need to organize this interaction on their own. More specifically, online students should initiate interaction with the instructor by asking questions or requesting clarifications, or by messaging the instructor about topics that may affect their success in the online course. So much so that the instructor may have limited clues to help them succeed in an online course. Finally, to be successful in student-student interaction, online learners must carefully and deliberately orchestrate interaction; for example, by interacting with peers in a timely manner and monitoring their interactions with others, or using interaction strategies such as writing, answering, and reflecting strategies (Cho, Cheon & Lim, 2021).

In this context, the main purpose of this research is to determine the online self-regulatory learning skills of pr-service Turkish teachers who will practice the teaching profession in the future. In this context, answers to the following questions were sought within the scope of the research:

1- Is there a significant difference between pre-service Turkish teachers' distance education experiences and online self-regulated learning skills?

2- Do pre-service Turkish teachers' online self-regulated learning skills differ significantly depending on their grade level?

3- Do pre-service Turkish teachers' online self-regulated learning skills differ significantly depending on the university they are enrolled in?

4- Do pre-service Turkish teachers' online self-regulated learning skills differ significantly depending on their synchronous or asynchronous attendance in classes?

5- Do pre-service Turkish teachers' online self-regulated learning skills differ significantly according to the frequency of synchronous attendance in classes?

6- Do pre-service Turkish teachers' online self-regulated learning skills differ significantly according to their grade point averages?

3. Methodology

3.1. Research Model/Design

This study, designed according to the descriptive survey model, aimed to determine online self-regulated learning skills of pre-service Turkish teachers in online learning environments. The descriptive survey model is a type of qualitative research in which opinions, thoughts, beliefs, and attitudes of large communities are taken on any subject. In this model, events and facts are also tried to be explained as they are (Karasar, 2017).

3.2. Data Collecting Tools

In the research, an information collection form consisting of six questions prepared by the researchers and the Online Self-Regulatory Learning Scale developed by Barnard et al. (2009) and adapted into Turkish by Samsa Yetik (2011) were used as data collection tools. This scale consists of consists of 24 items and six factors (Goal Setting, Environment Structuring, Task Strategies, Time Management, Help-Seeking, Self-Assessment). Permission to use the scale was obtained via e-mail.

3.3. Sampling or Study Group

The study group of the research consists of 213 1st, 2nd, 3rd and 4th grade students in the Turkish teaching program of 6 different universities in the spring semester of the 2022-2023 academic year. Convenience sampling was preferred in generating of the study group. This sampling method allows the researcher to select a sample group that one can easily reach. In this sampling method, since the researcher chooses a situation that is easy to reach, it is ensured that the research carried out quickly and practically. Convenience sampling is a frequently used sampling method in studies (Yıldırım and Şimşek, 2016). Since the spring semester of the 2022-2023 academic year in higher education institutions is conducted online, this method was preferred to determine the sample. The survey transferred to Google Forms was sent to pre-service teachers via e-mail and social media.

Table 1.

Study group

	Grade Level					
University Name	**1**	**2**	**3**	**4**	**Total**	**Percentage**
Afyon Kocatepe University	9	24	34	30	97	%45,5
Bülent Ecevit University	18	0	1	0	19	%8,9
Dumlupınar University	0	13	12	25	50	%23,4
Ordu University	0	0	1	6	7	%3,2
Uludağ University	0	7	9	1	17	%7,9
Aksaray University	2	7	13	1	23	%10,7
Total	29	51	70	63	213	%100
	%13,6	%23,9	%32,8	%29,5	%100	

3.4. Data Analysis

In order to collect the research data, the information collection form and the Online Self-Regulatory Learning Scale were shared with the pre-service teachers via Google Forms and the answers were collected. Turkish pre-service teachers' responses to the information collection form and the Online Self-Regulatory Learning Scale were analyzed with the IBM SPSS Statistics 25 program.

Table 2.

Normality test

Normality Test						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TOP	,061	213	,053	,990	213	,162
p>.05						

As a result of the tests performed to determine the normality of the distribution, the skewness (.049) and kurtosis (.577) values calculated between +1.00 and -1.00. Also the results obtained by dividing the skewness and kurtosis values by the standard error are between +1.96 and -1.96 values (Büyüköztürk, 2012; Büyüköztürk, Çokluk, & Köklü, 2012) and the Kolmogorov Smirnov test given in Table 2 found to be normal because p value is above .05 (p>.05). In the study, Independent Samples T-Test was used to determine whether the difference between the means of two independent samples was significant, and One Way ANOVA for Independent Samples was used to determine whether the difference between the mean of more than two samples was significant. When significant results were obtained in the one-way ANOVA, Tukey's test, one of the post-hoc techniques, was used to find the differences between groups. Because the variances homogeneously distributed.

3.5. Validity and Reliability

In this study, the Online Self-Regulatory Learning Scale developed by Barnard et al. (2009) were used as data collection tools. The Turkish adaption of this scale was made by Samsa Yetik (2011). The original five-point Likert type scale developed by Barnard et al. (2009) consists of 24 items and six factors (Goal Setting, Environment Structuring, Task Strategies, Time Management, Help-Seeking, Self-Assessment). The internal consistency coefficient of the Online Self-Regulated Learning Scale, which consists of 24 Likert-type items, is .89. Nunally (1978) stated that an internal consistency coefficient above .70 is sufficient for social science research (as cited in Barnard et al., 2009). As a result of the reliability analysis conducted in this study, the alpha coefficient of reliability was found to be .919.

3.6. Research Procedures

First, necessary permissions were obtained for the Turkish adaptation of the Online Self-Regulated Learning Scale for this study. Afterwards, six questions were added to the survey by the researchers to access the participants' online education experiences. The researchers applied to Afyon Kocatepe University Social and Human Sciences Research Ethics Committee for ethical permission, and ethics committee approval was obtained for this research from Afyon Kocatepe University Rectorate Social and Human Sciences Research Ethics Committee with the decision numbered 183123 and numbered 2023/178 dated 16/05/2023. After approval, the survey was transferred to the online platform via Google Forms and the survey was sent to 30 students for the pilot application. At the end of the pilot application, it has been noticed that the survey items were understandable, and the main application was delivered to pre-service teachers via Google Forms. Pre-service teachers were able to reach Google Forms via e-mail and social media.

3.7. Findings

In this section, the relationships between pre-service Turkish teachers' online self-regulated learning skills in online environments and their grade level, online learning experiences, academic achievements, and frequency of participation in online education were examined.

Table 3.

Grade levels and universities of pre-service Turkish teachers participating in the study

	Grade Level					
University	**1**	**2**	**3**	**4**	**Total**	**%**
Afyon Kocatepe University	9	24	34	30	97	%45,5
Bulent Ecevit University	18	0	1	0	19	%8,9
Dumlupınar University	0	13	12	25	50	%23,4
Ordu University	0	0	1	6	7	%3,2
Uludağ University	0	7	9	1	17	%7,9
Aksaray University	2	7	13	1	23	%10,7
Total	29	51	70	63	213	%100
	%13,6	%23,9	%32,8	%29,5	%100	

In Table 3, information about the university and grade levels of the pre-service teachers who participated in the research, is given. According to the table, Afyon Kocatepe University students mostly participated in the study. At grade levels, it was noted that the highest participation was in the third graders, while the least participation was in the first graders.

Table 4.

Independent samples t-test results for the relationship between distance education experiences and online self-regulated learning skills of pre-service teachers

	Distance Education Experience	N	x	ss	Sd	t	p
Goal setting	I experienced it for the first time.	84	17,2738	3,76	211	-,402	,688
	I've experienced it before.	129	17,4806	3,60			
Environment structuring	I experienced it for the first time.	84	15,0476	3,05	211	-2,204	,029
	I've experienced it before.	129	15,9147	2,63			
Task strategies	I experienced it for the first time.	84	12,2857	3,02	211	2,043	,042
	I've experienced it before.	129	11,4574	2,80			
Time management	I experienced it for the first time.	84	9,4405	2,52	211	1,907	,058
	I've experienced it before.	129	8,7054	2,88			
Help seeking	I experienced it for the first time.	84	13,2976	3,26	211	-,998	,319
	I've experienced it before.	129	13,7442	3,14			
Self evaluation	I experienced it for the first time.	84	13,4524	3,62	211	,563	,574
	I've experienced it before.	129	13,1860	3,20			

In Table 4, the relationship between the pre-service teachers participating in the research, whether they have experienced the distance education process before or not, and their online self-regulation skills are given. According to the Independent Samples T-Test, since the p-value is greater than .05, the pre-service teachers' goal-setting skills in online self-regulation do not show a significant difference according to whether they experienced the distance education process for the first time or experienced it before. According to the table, it is noticed that since the p-value is smaller than .05, the pre-service teachers' skills of environment structuring in online self-regulation show a significant difference in favor of the pre-service teachers who have experienced online learning before. The task strategies skill values of the pre-service teachers who experienced the distance education process for the first time are 12,2857, and the task strategies skill values of those who had previously experienced the distance education process are 11,4574. According to the table, since the p-value is smaller than .05, pre-service teachers' task strategy skills in

online self-regulation show a significant difference in favor of pre-service teachers who experienced online learning for the first time. According to the Independent Samples T-Test, since the p-value is greater than .05, the time management skills of pre-service teachers in online self-regulation do not show a significant difference according to whether they experienced the distance education process for the first time or experienced it before. Pre-service teachers' ability to seek help in online self-regulation also does not differ significantly according to whether they experience the distance education process for the first time or have experienced it before, since the p-value is greater than .05. According to the table, since the p-value is greater than .05, the self-assessment skills of pre-service teachers in online self-regulation do not show a significant difference according to whether they experienced the distance education process for the first time or experienced it before.

It is concluded that there is no significant difference between pre-service teachers' self-regulated learning in goal-setting, time management, help-seeking and self-assessment skills, according to their first experience or previous experience. In addition to that environment structuring skills show a significant difference in favor of pre-service teachers who have experienced online learning before, while task strategy skills show a significant difference in favor of pre-service teachers who experienced online learning for the first time.

Table 5.

Independent samples t-test results for the relationship between attendance in distance education and online self-regulated learning skills of pre-service teachers

	Attendance in Distance Education	N	x	ss	Sd	t	p
Goal-setting	I attended classes synchronously.	83	18,7349	3,40	211	4,439	,000
	I attended classes asynchronously.	130	16,5462	3,57			
Environment structuring	I attended classes synchronously.	83	15,9157	2,58	211	1,415	,158
	I attended classes asynchronously.	130	15,3538	2,96			
Task strategies	I attended classes synchronously.	83	12,6747	2,90	211	3,668	,000
	I attended classes asynchronously.	130	11,2154	2,78			
Time management	I attended classes synchronously.	83	9,9880	2,64	211	4,338	,000
	I attended classes asynchronously.	130	8,3615	2,66			
Help-seeking	I attended classes synchronously.	83	13,9518	2,80	211	1,406	,161
	I attended classes asynchronously.	130	13,3231	3,40			
Self evaluation	I attended classes synchronously.	83	14,000	3,29	211	2,483	,014
	I attended classes asynchronously.	130	12,8385	3,35			

In Table 5, the relationship between synchronised /asynchronised attendance to the online courses of the pre-service teachers and their online self-regulated learning skills are given. According to the Independent Samples T-Test, the goal-setting skill values of pre-service teachers who attend the courses syncronyously is 18.7349, and the goal-setting skill values of those who follow the courses asynchronously by following the archive records are 16.5462. According to the table, since the p-value is smaller than .01, the pre-service teachers' goal-setting skills in online self-regulated learning differ according to the synchronised /asynchronised attendance, and this difference is in favor of the pre-service teachers who attend the classes synchronously. However, as mentioned above, the pre-service teachers' skills in online self-regulated learning do not differ significantly according to their synchronous/asynchronous following the lesson, since p-value is greater than .05. It is also observed that online self-regulated learning task strategies skills of pre-service teachers differ according to their synchronised /asynchronised attendance and this difference is in favor of the pre-service teachers who attend the lessons synchoronously. As mentioned in the table above,

pre-service teachers' time management skills in online self-regulated learning differ according to the synchronised /asynchronised attendance, since the p-value is smaller than .01, and this difference is in favor of the pre-service teachers who attend the courses synchronously. However, since the p-value is greater than .05, the pre-service teachers' help-seeking skills in online self-regulated learning do not differ significantly according to their synchronised /asynchronised attendance. The self-assessment skills of the pre-service teachers who attend the courses synchronously are 14,000, and the self-assessment skills of those who follow the courses asynchronously are 12,8385. According to the table, since the p-value is smaller than .05, self-evaluation skills of the pre-service teachers in online self-regulated learning differ according to the synchronised /asynchronised attendance, and this difference is in favor of the pre-service teachers who attend the classes synchronously.

Table 6.

One-way anova results for the relationship between grade levels and the online self-regulated learning skills of the pre-service teachers

	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant difference
Goal-setting	Between Groups	49,772	3	16,591	1,242	,295	No significant difference
	Within Groups	2791,308	209	13,356			
	Total	2841,080	212				
Environment structuring	Between Groups	37,808	3	12,603	1,585	,194	No significant difference
	Within Groups	1662,314	209	7,954			
	Total	1700,122	212				
Task strategies	Between Groups	41,579	3	13,860	1,647	,180	No significant difference
	Within Groups	1758,487	209	8,414			
	Total	1800,066	212				
Time management	Between Groups	18,781	3	6,260	,816	,487	No significant difference
	Within Groups	1604,214	209	7,676			
	Total	1622,995	212				
Help-seeking	Between Groups	5,355	3	1,785	,173	,914	No significant difference
	Within Groups	2152,908	209	10,301			
	Total	2158,263	212				
Self evaluation	Between Groups	10,177	3	3,392	,296	,828	No significant difference
	Within Groups	2397,776	209	11,473			
	Total	2407,953	212				

According to Table 6, the online self-regulated learning skills of pre-service teachers are determined by goal-setting[$F_{3\text{-}209}$= 1,242; p>,05], environment structuring [$F_{3\text{-}209}$= 1,585; p> .05], task strategies[$F_{3\text{-}209}$= 1.647; p> .05], time management[$F_{3\text{-}209}$=,816; p>,05], help- seeking[$F_{3\text{-}209}$=,173; p> .05] and self-evaluation[$F_{3\text{-}209}$=,296; p>,05] sub-dimensions do not show a significant difference according to their grade levels.

Table 7.

One-Way ANOVA results for the relationship between the universities and the online self-regulated learning skills of the pre-service teachers

	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant difference
Goal-setting	Between Groups	125,154	5	25,031	1,908	,094	No significant difference
	Within Groups	2715,926	207	13,120			
	Total	2841,080	212				
Environment structuring	Between Groups	41,687	5	8,337	1,041	,395	No significant difference
	Within Groups	1658,435	207	8.012			
	Total	1700,122	212				
Task strategies	Between Groups	49,602	5	9,920	1,173	,324	No significant difference
	Within Groups	1750,464	207	8,456			
	Total	1800,066	212				
Time management	Between Groups	27,542	5	5,508	,715	,613	No significant difference
	Within Groups	1595,453	207	7,708			
	Total	1622,995	212				
Help-seeking	Between Groups	32,586	5	6,517	,635	,674	No significant difference
	Within Groups	2125,677	207	10,269			
	Total	2158,263	212				
Self evaluation	Between Groups	40,420	5	8,804	,707	,619	No significant difference
	Within Groups	2367,533	207	11,437			
	Total	2407,953	212				

According to Table 7, the online self-regulated learning skills of the pre-service teachers are determined by goal-setting[$F_{5\text{-}207}$= 1.908; p>,05], environment structuring[$F_{5\text{-}207}$= 1.041; p> .05], task strategies[$F_{5\text{-}207}$= 1.173; p> .05], time management[$F_{5\text{-}207}$=,715; p> .05], help- seeking[$F_{5\text{-}207}$=,635; p> .05] and self-evaluation[$F_{5\text{-}207}$=,707; p>,05] do not show a significant difference in sub-dimensions according to the university variable.

Table 8.

One-Way ANOVA results for the relationship between the frequence of synchronized attendance and the online self-regulated learning skills of the pre-service teachers

	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant difference
Goal-setting	Between Groups	458,999	4	114,750	10,020	,000	always- occasionally always- never usually- occasionally Usually- never sometimes- occasionally
	Within Groups	2382,081	208	11,452			
	Total	42788,657	212				
Environment structuring	Between Groups	164,349	4	41,087	5,565	,000	always- occasionally always- never

	Within Groups	1535,773	208	7,384			Usually- never sometimes- never
	Total	1700,122	212	46,244			
Task strategies	Between Groups	184,974	4	7,765	5,955	,000	always-sometimes always- occasionally always- never Usually- never
	Within Groups	1615,092	208				
	Total	1800,066	212				
Time management	Between Groups	301,002	4	75,250	11,840	,000	Always-sometimes always- occasionally always- never Usually- never Usually-occasionally sometimes-occasionally sometimes-never
	Within Groups	1321,994	208	6,356			
	Total	1622,995	212				
Help-seeking	Between Groups	205,884	4	51,471	5,484	,000	always- never Usually- never Sometimes-never Occasionally-never
	Within Groups	1952,379	208	9,386			
	Total		212				
Self evaluation	Between Groups	218,121	4	54,530	5,180	,001	always- never Usually- never Sometimes-never Occasionally-never
	Within Groups	2189,832	208	10,528			
	Total	2407,953	212				

Table 8 determined that the online self-regulated learning skills of the pre-service teachers differ significantly in the goal-setting sub-dimension, according to the frequency of synchronised participation in the courses [$F_{4\text{-}208}$=10,020; p<0.001]. According to the results of the Tukey test for homogeneous variances, a significant difference in the online self-regulated learning skills goal-setting sub-dimension has been found in favor of the pre-service teachers who *always* attended in the synchronous courses, between the pre-service teachers who *occasionally* attended and *never* attended. In the goal-setting sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *usually* attend the synchoronous courses and the pre-service teachers who *occasionally* attend the synchoronous courses and those who *never* attend the synchoronous courses in favor of those who *usually* attend. In the goal-setting sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *sometimes* attend the synchoronous courses and those who *occasionally* attend the synchoronous courses in favor of those who *sometimes* attend. It determined that the online self-regulated learning skills of the pre-service teachers differ significantly in the environment structuring sub-dimension, according to the frequency of synchronized attendance in the courses [$F_{4\text{-}208}$=5,565; p<,001]. In the environment structuring sub-dimension of online self-regulated learning skills, there is a significant difference in favor of the pre-service teachers who *always* attend in the synchronous courses, between the pre-service teachers who *occasionally* attend and *never* attend. In the environment structuring sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *usually* attend the synchoronous courses and those who *never* attend the synchoronous courses in favor of those who *usually* attend. In the environment structuring sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *sometimes* attend the synchoronous courses and those who *never* attend the synchoronous courses in favor of those who *sometimes* attend. It determined that the online self-regulated learning skills of the pre-service teachers differ significantly in the task strategies sub-dimension, according to the frequency of synchronised attendance in the courses [$F_{4\text{-}208}$=7,765; p<,001]. There is a significant difference in the online self-regulated learning skills task strategies sub-dimension has been found in favor of the pre-service

teachers who *always* attend in the synchronised courses, between the pre-service teachers who *sometimes* attend and *never* attend. In the task strategies sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *occasionally* attend in the synchronous courses and *never* attend, in favor of pre-service teachers who *occasionally* attend. In addtion to these, the time management sub-dimension of the online self-regulated learning skills of the pre-service teachers differ significantly according to the frequency of synchronised attendance in the courses [$F_{4\text{-}208}$=11,840; p<,001]. There is a significant difference between the pre-service teachers who *always* attend in the synchronous courses, who those *sometimes* attend and those *never* attend, in favor of pre-service teachers who *always* attend. There is a significant difference between the pre-service teachers who *always* attend in the synchronous courses, who those *sometimes* attend and those *never* attend, in favor of pre-service teachers who *always* attend. In the time management sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *usually* attend in the synchronous courses, who those *occasionally* attend and those *never* attend, in favor of pre-service teachers who *usually* attend. In the time management sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *sometimes* attend in the synchronous courses, who those *occasionally* attend and those *never* attend, in favor of pre-service teachers who *sometimes* attend. It determined that the online self-regulated learning skills of the pre-service teachers differ significantly in the help-seeking sub-dimension, according to the frequency of synchronised attendance in the courses [$F_{4\text{-}208}$=5,484; p<,001]. A significant difference in the help-seeking sub-dimension of online self-regulated learning skills has been found in favor of the pre-service teachers, who *always* attend in the synchronous courses, between the pre-service teachers who *always* attend and those who *never* attend in the synchoronous courses. In the help-seeking sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *usually* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *usually* attend. In the help-seeking sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *sometimes* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *sometimes* attend. In the help-seeking sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *occasionally* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *occasionally* attend. It determined that the online self-regulated learning skills of the pre-service teachers differ significantly in the self evaluation sub-dimension, according to the frequency of synchronised attendance in the courses [$F_{4\text{-}208}$=5,180; p<,001]. A significant difference in the online self-regulated learning skills self evaluation sub-dimension has been found in favor of the pre-service teachers who *always* attend in the synchronous courses, between the pre-service teachers who *always* attend and *never* attend. In the self evaluation sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *occasionally* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *occasionally* attend. In the self evaluation sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *sometimes* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *sometimes* attend. In the self evaluation sub-dimension of online self-regulated learning skills, there is a significant difference between the pre-service teachers who *occasionally* attend in the synchronous courses and who those *never* attend, in favor of pre-service teachers who *occasionally* attend.

Table 9.

One-Way ANOVA results for the relationship between GPA and the online self-regulated learning skills of the pre-service teachers

	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant difference
Goal setting	Between Groups	162,721	4	40,680	3,159	,015	2,50-3,00 2,00-2,50
	Within Groups	2678,359	208	12,827			
	Total	2841,080	212				
Environment structuring	Between Groups	45,903	4	11,476	1,443	,221	No significant difference
	Within Groups	1654,219	208	7,953			
	Total	1700,122	212				
Task strategies	Between Groups	168,247	4	42,062	5,361	,000	2,50- 3,00 2,00-2,50 - 3,00-3,50 2,50-3,00 - 3,50-4,00 2,00-2,50
	Within Groups	1631,819	208	7,845			
	Total	1800,066	212				
Time management	Between Groups	112,027	4	28,007	3,855	,005	2,50-3,00 2,00-2,50 - 3,00-3,50 2,50-3,00
	Within Groups	1510,969	208	7,264			
	Total	1622,995	212				
Help seeking	Between Groups	88,903	4	22,226	2,234	,067	No significant difference
	Within Groups	2069,360	208	9,949			
	Total	2158,263	212				
Self evaluation	Between Groups	109,715	4	27,429	2,482	,045	2,50-3,00 2,00-2,50
	Within Groups	2298,238	208	11,049			
	Total	2407,953	212				

Table 9 shows that the pre-service teachers' online self-regulated learning goal-setting skills differ according to the GPA. [$F_{4\text{-}208}$=3,159; p<0.05]. According to the results of the Tukey test for homogeneous variances, a significant difference in the online self-regulated learning skills goal-setting sub-dimension has been found between the pre-service teachers whose GPA is between 2.50 to 3.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 2.50 to 3.00. According to the table, the online self-regulated learning skills of pre-service teachers do not differ in the sub-dimensions named environment structuring [F4-208= 1,443; p> .05] and help-seeking[F4-208= 2,234; p> .05] according to the GPA variable. Table 9 show that the online self-regulated learning skills of the pre-service teachers differ significantly in the task strategies sub-dimension, according to the pre-service teachers' GPAs. [$F_{4\text{-}208}$=5,361; p<,001]. A significant difference in the online self-regulated learning skills task strategies sub-dimension has been found between the pre-service teachers whose GPA is 2.50 to 3.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 2.50 to 3.00. There is another siginificant difference between pre-service teachers whose GPA is 3.00 to 3.50 and those whose GPA is 2.50 to 3.00, in favor of pre-service teachers whose GPA is 3.00 to 3.50. A significant difference in the online self-regulated learning skills task strategies sub-dimension has been found between the pre-service

teachers whose GPA is 2.50 to 3.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 2.50 to 3.00. A significant difference in the online self-regulated learning skills task strategies sub-dimension was found between the pre-service teachers whose GPA is 3.50 to 4.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 3.50 to 4.00. Table 9 show that the online self-regulated learning skills of the pre-service teachers differ significantly in the time management sub-dimension, according to the pre-service teachers' GPAs. [$F_{4\text{-}208}$=3,855; p<,005]. A significant difference in the online self-regulated learning skills time management sub-dimension has been found between the pre-service teachers whose GPA is 2.50 to 3.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 2.50 to 3.00. In the time management sub-dimension of online self-regulated learning skills, there is another significant difference between pre-service teachers whose GPA is 3.00 to 3.50 and those whose GPA is 2.50 to 3.00, in favor of pre-service teachers whose GPA is 3.00 to 3.50. Table 9 show that the online self-regulated learning skills of the pre-service teachers differ significantly in the self evaluation sub-dimension, according to the pre-service teachers' GPAs. [$F_{4\text{-}208}$=2,482; p<,005]. A significant difference in the online self-regulated learning skills self evaluation sub-dimension has been found between the pre-service teachers whose GPA is 2.50 to 3.00 and those whose GPA is 2.00 to 2.50, in favor of the pre-service teachers whose GPA is 2.50 to 3.00.

4. Discussions and Conclusion

In online learning, where an interactive learning environment is required for an effective learning process, some students can adapt to this process and be successful, while some students find it very difficult and cannot manage the process. The main challenge in online learning is often the lack of self-discipline, self-regulated learning skills, and self-control over one's own learning. In this study, the online self-regulated learning skills of Turkish pre-service teachers who have experienced the online learning process before or have experienced this process for the first time were determined. And it is determined that there is no significant difference in all sub-dimensions of pre-service teachers' online self-regulated learning skills (environmental structuring, goal-setting, task strategies, help-seeking, time management, self-evaluation) in variables such as grade level and the university they registered in. After examining the relationship between pre-service teachers' online self-regulated learning skills and their experiences with distance education, significant differences were found in various sub-dimensions. It was determined that the pre-service teachers' online self-regulated learning skills of environment structuring show a significant difference in favor of the pre-service teachers who have experienced distance education before, while in the task strategies sub-dimension, a significant difference is in favor of the pre-service teachers who have experienced distance education for the first time.

Significant differences were found in different sub-dimensions and different variables. In help-seeking and self-evaluation sub-dimensions of online self-regulated learning skills, it observed a significant difference between the pre-service teachers who occasionally attend synchronized courses and those who never attend synchronized courses, in favor of those who occasionally attend synchronized courses. In the study of Barut Tuğtekin (2022), it also concluded that attendance in online learning activities contributed positively to self-regulated learning skills. Similarly, another study, which reveals self-regulated online learning perceptions of pre-service teachers, concluded that the more time they spend in online environments, the higher self-regulated online learning perceptions of pre-service teachers get (Özdemir & Önal, 2021). It has been noticed that the online self-regulated learning skills of the pre-service teachers differ significantly according to their GPAs and this significant difference varies according to the sub-dimensions. In the sub-dimensions of online self-regulated learning skills, such as goal setting, time management, self-assessment, and task strategies, a significant difference was determined between the pre-service teachers whose GPA was 2.50 to 3.00 and the pre-service teachers whose GPA was 2.00 to 2.50, in favor of the pre-service teachers whose GPA was 2.50 to 3.00. In addition, sub-dimensions of online self-regulated learning skills, such as time management and task strategies, a significant difference was determined between the pre-service teachers whose GPA was 3.00 to 3.50 and the pre-service teachers whose GPA was 2.50 to 3.00, in favor of the pre-service teachers whose GPA was 3.00 to 3.50. All these results show that GPA has a

significant impact on self-regulated learning skills. Barut Tuğtekin (2022), in her study examining the self-regulated learning skills levels of university students, revealed that students with high academic achievement had higher self-regulated learning skills levels than those with low academic achievement. In the study of Tülübaş (2022), the relationship between pre-service teachers' online self-regulated learning skills and their academic achievement revealed and concluded that self-regulated learning skills were a significant predictor of academic achievement in online learning. In another study, university students' self-regulated learning skills were examined in terms of various variables, and a significant relationship was found between academic achievement and self-regulated learning skills in the time management sub-dimension (Özdemir & Yavuzalp, 2018). In a different study, it was concluded that self-efficacy and positive self-regulation behaviors were reliable predictors of academic achievement (Bradley, Browne, & Kelley, 2017). Barnard Brak et al. (2010) found that unorganized profiles in self-regulated learning were associated with poor academic outcomes and low-grade averages in their study on self-regulated learning in online learning environments. The highest score that could obtain from the scale used in the study is 120. The average of the online self-regulated learning skills scores of the pre-service teachers in the sample group was calculated as 80.65. It observed that pre-service teachers' online self-regulation skills are not very high. The study conducted by Tülübaş (2022) also revealed that the self-regulated learning skills of pre-service teachers in online learning are at an intermediate level.

In conclusion, the study shows that GPAs, synchronized/asynchronized attendance to the courses, frequence of synchronized attendance to the courses, distance education experiences effect the self-regulated learning skills of pre-service teachers. Whether it is the education to get a profession or education for the individuals applying to improve themselves, online learning and distance education are frequently preferred today. In this type of education, which has the autonomy to participate at any time and anywhere, the learners must organize their learning process. The learners should be able to decide and organize their learning processes based on their learning experiences. In this context, the importance of self-regulated learning skills emerges in online learning, where the learner's freedom is at the forefront. It has been revealed through many studies that students cannot get efficiency in distance education processes, which are continued on and off in universities (Duman, 2020; Denge and Sulak, 2020; Erşen and Yumak, 2021; Karakaş Yıldırım, 2022; Sağlamel and Erbay Çetinkaya, 2022; Ülker, 2020). Self-regulation skills have to be gained before the university level to be effective in online or distance education processes. Self-regulated learning, which requires forward-looking predictions and acting, should be able to keep up with the change and development of the learning context of the students (Barnard, Lan, To, Osland Paton, & Lai, 2009).

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