Adaptation of the Scale of Student Engagement in Online Learning Environments into Turkish Language[1]

Mehmet Yıldız[2]   Türkan Karakuş Yılmaz[3] Mehmet Barış Horzum[4]

Abstract
The development of technology and the widespread use of online education environments have emphasized the importance of engagement, which plays a critical role in an effective and efficient learning experience in online learning environments. Since there is no measurement tool in the literature to reveal different aspects of engagement, a multidimensional concept that requires effort, motivation, belonging, and commitment beyond just being present in the lesson, a scale adaptation was made to fill this gap. In our study, we adapted the 'Student Engagement in Online Learning Environments Scale' (SEOLES) developed by Inder (2021), which examines participation with the dimensions of skill, emotional, cognitive, social, performance, and valuing the lesson, into Turkish language. The adaptation process involved translation and retranslation through consultation with language and field experts, followed by pre-pilot and pilot applications. A total of 628 participants with at least one semester of distance education experience contributed to the study. Reliability analysis showed high scale reliability (α=.968) and scales' dimensions reliability values ranging from .814 to .919. Confirmatory factor analysis (CFA) indicated good fit indices (e.g., RMSEA=.063, CFI=.941, GFI=.880). Convergent validity was supported by CR values exceeding .7 and AVE values over .5 for all factors, while divergent validity was achieved with most HTMT values below 0.90. These results confirm the scale's valid and reliable structure in Turkish. This adaptation provides a comprehensive tool for evaluating engagement in online learning, aiding higher education institutions in improving and restructuring their practices to enhance student engagement in distance education.

Keywords: Online learning, participation, distance education, engagement, scale adaptation.

Introduction

Distance education has gained significant momentum with the rapid developments in technology and the forced transformation following various problems experienced, especially at the global level. The comprehensive integration of digital technologies into educational areas was stated that these tools can increase students' problem-solving skills, collaboration, and student engagement with innovative methods and concepts (Paetsch & Drechsel, 2021; Peled, 2021). These opportunities have led to the online delivery of many courses today, especially in higher education (Getenet et al., 2024). Learners' engagement is important for an effective and efficient learning process in online courses. Especially in cases where participants feel isolated from the environment, engagement plays a critical role (Dixson, 2015). This has led the concept of learner participation to attract attention in recent years (Abbasi et al., 2023). Despite the popularity of this topic, there is no consensus on the conceptual definition and types of engagement (Dinçer et al., 2019). Therefore, teachers and researchers need to be able to measure students' engagement (Dixson, 2015). However, the term engagement is not a simple concept (Leach, 2016). Engagement has previously focused on what students do to improve their learning (time, effort, and commitment to their work), how they use resources, their willingness to work, and their understanding of learning (Leach, 2016). However, research has shown that engagement is more complex and includes belonging, motivation, and community involvement (Coates 2006).

In the literature, most of the studies in online education or distance education have focused on students' satisfaction, desire, or achievement level (Inder, 2021). Various studies have been conducted on students' engagement (Ergün & Usluel, 2015; Francescucci & Foster, 2013; Matthews et al., 2017), but these studies have examined the concept of engagement with limited dimensions. But engagement plays a crucial role in online learning processes, influenced by multiple factors, and necessitates a thorough exploration of the obstacles hindering successful online learning environments, along with strategies to enhance effective learning outcomes (Anastasakis et al., 2021; Cavanaugh et al., 2022). The lack of such a study in the literature shows that there is a need for a scale that deals with the concept of engagement in a multidimensional way in Türkiye. In this study, an engagement scale that can be considered as multidimensional in online learning was adapted into Turkish and the processes of ensuring its validity and reliability were explained. The study is important for the online course processes to be carried out in Türkiye in terms of both measuring engagement in different aspects and providing an opportunity for researchers and educators to make the processes more effective and efficient.

Literature Review

In distance education, students and teachers have more freedom and equipment to achieve outcomes, discuss, clarify concepts, and move forward (Agustina & Cahyono, 2017). In distance education, concepts such as online learning, e-learning, learning, web-based learning and internet based learning are used interchangeably (Tunga & İnceloğlu, 2016). Online learning can be defined as an online technology application used for learning purposes (Horton, 2000). In other words, online learning is a multimedia-based educational process that utilizes online internet resources and components to create a learning environment that supports learning (Khan, 1997). For an education to be online learning, at least 80% of the content should be presented online and at the same time there should be no face-to-face learning activities (Allen et al., 2016).

Regardless of its nature, it has been empirically established that online learning has many effective outcomes for education in general (Aldossary, 2021; Derakhshan et al., 2021). However, online learning, which gives students the opportunity to learn anytime, anywhere, has limitations as well as advantages (Means et al., 2013; Topal, 2020; Yıldız et al., 2021). The difficulty of attracting students to online learning environments (Inder, 2022) causes low participation (Czerkawski & Lyman, 2016) and insufficient interaction (Cheong & Cheung, 2008). It is stated that online students are more sensitive about dropping out of the course, so online programmes have lower completion rates than face-to-face education (Woodley & Simpson, 2014). The low completion rates among online students are often linked to challenges such as time management difficulties, overwhelming life responsibilities, unrealistic expectations, feelings of isolation, and a perception of being undervalued within the

institutional culture. (Brown et al, 2015; Mallman & Lee, 2016). Online participation and achievement are fundamental factors contributing to student attrition, making it essential to identify the needs of online learners and gain a deeper understanding of their experiences to enhance their success and engagement in higher education (Brunton et al., 2018).

The level of student engagement in online learning has a significant impact on the effectiveness and quality of instruction (Bell, 2023). Whether it is online learning or face-to-face education, the quality of learning and the occurrence of positive learning outcomes depend on engagement in the learning environment (Li, 2023). Numerous studies in the literature have highlighted the drawbacks of online education, including challenges in capturing students' attention, managing the virtual classroom, fostering participation and interaction, and mitigating negative emotions such as unfavorable attitudes, stress, and boredom. (Benadla & Hadji, 2021; Derakhshan et al., 2021; Pawlak et al., 2021).

Engagement, often referred to as student-student and student-instructor interaction (Hrastinski, 2008), allows students to develop critical thinking skills, reflect on learning materials and improve their cognitive abilities (Bliss & Lawrence, 2009). Online participation is a multifaceted concept that aims to interact and exchange information in the digital environment and refers to many activities such as commenting, liking, sharing, discussion, and contributing to content (Farrell & Brunton, 2020). Engagement, which has an important role in the learning process, includes the communication, connection and interaction that learners establish with each other and their actions in the online environment (Hrastinski, 2009; Weber, 2014; Zheng & Warschauer, 2015). Hrastinski (2009) defines engagement as a complex process that involves speaking, thinking, feeling and belonging. In other words, participation is taking part in the learning environment and being in connection with other components in the learning environment (Hrastinski, 2006).

Engagement in online learning environments is complex, multidimensional and controversial (Trowler & Trowler, 2010). Many studies have defined engagement in multiple dimensions such as behavioral, psychological and socio-cultural perspectives (Kahu, 2013); or behavioral, emotional and cognitive (Gunuc & Kuzu, 2015). Since engagement is a multidimensional concept, a subject on which there is no consensus in the literature, it is referred to as a "black box" (Hatch, 2012). Kahu and Nelson (2018) suggest that understanding the drivers of student engagement should be explored in different contexts to understand it. At this point, effective measurement of engagement is also important for researchers and instructors (Dixson, 2015). For this reason, the study aimed to adapt the "Student Engagement in Online Learning Environments Scale" (SEOLES), which enables the measurement of engagement with its different dimensions.

In the literature on online engagement, Burch et al., (2015) adapted an engagement scale and presented the four dimensions as emotional, physical, in-class cognitive and out-of-class cognitive engagement. The study was conducted with 354 volunteer university students. In another example; Dixson (2015) analysed Handelsmann et al.'s (2005) study in four different dimensions: skill, emotion, engagement and performance. Kahu and Nelson, on the other hand, addressed engagement in a different way by adding educational interface and institutional factors in addition to the psychosocial characteristics of students. Ergün and Usluel, (2015) adapted a scale that deals with engagement in cognitive, affective and behavioural dimensions into Turkish. While 398 undergraduate students took part in the study, the participants consisted of students enrolled in different departments in the faculty of education. Gunuç and Kuzu, (2015) developed an engagement scale in higher education. In the study conducted with 805 students from different departments at the undergraduate level, the scale consists of campus engagement and class engagement components. Koçak and Göksü, (2023) developed a scale for live online courses in higher education. While 1039 undergraduate students participated in the study, the scale, consisting of 6 dimensions (social, instructional, technological, emotional, behavioural, and withdrawal) and 46 items was validated. Sulla et al., (2023) conducted a study on student engagement in higher education. The study, which consists of 4 dimensions: skills, emotional engagement, participation, and performance, was conducted with 299 university students.

In this study, the scale developed by Inder, (2021) was adapted from the engagement frameworks of Handelsmann et al., (2005), Burch et al., (2015), and Dixson, (2015), each of which was examined in various aspects and discussed more comprehensively. The scale consists of six dimensions: skill

engagement, emotional engagement, cognitive engagement, participation engagement, performance engagement and value to the course (Figure 1.). The dimensions of the scale are defined below.
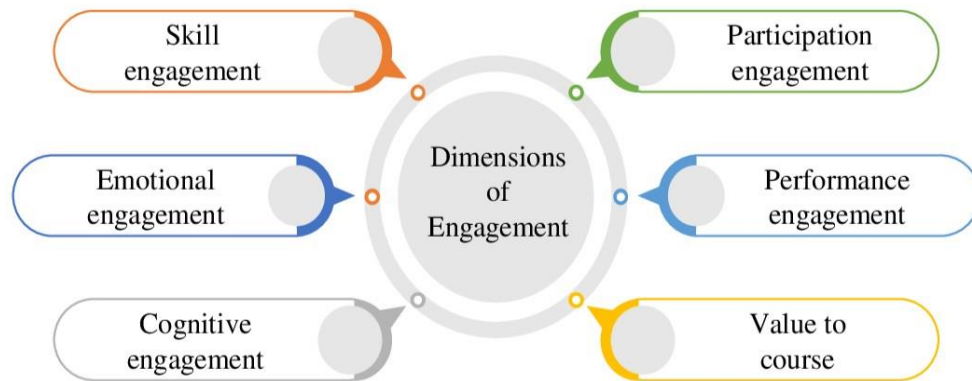

Figure 1. Dimensions of Engagement

The dimensions of the scale are defined below.

Skill engagement

Skill engagement, which is one of the dimensions of student engagement, focuses on the effort of the students during the lesson. In other words, it is defined as the endeavour to achieve the goals. Skill engagement refers to making an effort to study regularly, reading course materials, taking notes, organising course content, listening and reading attentively, systematic note-taking, delivering presentations, and active participation in video sessions (Dixson, 2015).

Emotional engagement

Emotional engagement is the interest in classroom activities and peers, the course, the instructor and the learning process, and feelings towards learning (Fredricks et al., 2004). Students develop a stronger emotional connection to a course when they find it engaging and perceive its applicability to their real lives (Handelsmann et al., 2005). Establishing an emotional connection between students and the lesson enhances their effort, makes the lessons more engaging, and fosters a greater desire to learn (Dixson, 2015). In order to ensure emotional engagement and to arouse a sense of curiosity in the students, there are entertaining clues both from the teacher and in the written materials. (Yıldırım et al., 2016). Meyer and Turner (2006) drew attention to the necessity of emotional engagement in learning, which contributes to the positive teacher-student relationship and interaction necessary for learning motivation. Positive emotions facilitate learning by improving cognition, attention, and motivation for action (Williams et al., 2013), while also strengthening emotional engagement between instructors and students (Black & Allen, 2018).

Cognitive engagement

Cognitive engagement is students' cognitive efforts in the learning process (Koçak & Göksu, 2023). Cognitive engagement refers to students being active in the learning process (Redmond et al., 2018) and is one of the most fundamental components of engagement (Bowen, 2005). This concept is defined as students' engagement in the learning process to understand complicated ideas and overcome difficult tasks (Fredricks et al., 2004). Cognitive engagement indicates the behavioural perspective on the student's response to self-regulation and the effective use of learning strategies (Park & Yun, 2017). Cognitive engagement is considered self-regulation, applying advanced learning strategies and participating individually in the learning environments (Fredricks et al., 2004). As a result, the cognitive dimension of engagement has the potential to increase engagement in the learning process (Inder, 2021).

Participation engagement
Learning occurs when students interact with their peers, content and instructors, engaging in meaningful social interaction. As noted by Handelsman et al., (2005), this concept is closely tied to peer interaction and enjoyment of the course content. Social interaction fosters participation, which facilitates the social construction of knowledge and enhances students' satisfaction levels (Drouin, 2008). Dixson (2015) emphasizes that activities such as enjoying online discussions, participating in forums, assisting peers, and consistently contributing to online forums significantly enhance engagement.

Performance engagement
Performance engagement refers to the student's effort to get high grades and to perform successfully in assignments. It reflects the student's desire to succeed in the course and his/her participation commitment (Dixson, 2015; Handelsman et al., 2005). This dimension includes elements such as focusing on the lesson, giving full attention to the lesson and making an effort in teaching activities (Skinner et al., 2008). In general, behavioural engagement can be considered as students actively participating in the activities in the course, obeying the classroom rules and willingly and sincerely performing their duties in the course.

Value to course
The dimension of value to course is primarily described as the importance attributed to its activities. For instance, Purinton and Burke (2019) highlight that the perceived value of assignments, as evaluated by students, should be considered a critical aspect of student participation. Perceived value assesses whether students find assignments to be distinctive, innovative, and sufficiently creative to enhance the course's overall worth. Value to course fosters student engagement by providing opportunities for active learning and higher-order thinking (Graeff, 2010). When a course acts as a connection between students and the content (Dixson, 2015), fostering the use of higher-order thinking skills to apply concepts to practical, real-world issues (Handelsman et al., 2005), students gain significant value from engaging in an online course.

Method

Research Model
The research is a scale adaptation study. In the scale adaptation process, a scale developed in a different language is adapted to another language and culture. In this respect, the "Student Engagement Scale for Online Courses" (Inder, 2021), originally developed in English, was adapted to the Turkish language and culture. In the scale adaptation process, first, translation-back-translation is performed for the linguistic translation of the scale, then the scale in both languages is applied by people who are fluent in both languages for linguistic equivalence and similarity in scores, and procedures for criterion, construct validity and reliability are performed by applying the scale to the sample group (Hambelton, 2005). The same procedures were applied in this study. However, the linguistic equivalence step was carried out by taking expert opinion.

In scale adaptation studies, only confirmatory factor analysis (CFA) is considered sufficient (Seçer, 2015). The process of CFA is to fit the factor loadings as closely as possible to the target matrix (Kline, 2011). This analysis is the most commonly used method to examine the model fit of the factor structure of the scale in the original language in the process of adapting a measurement tool developed in a different language into Turkish (Seçer, 2015). The study was conducted with 22.4 times the number of participants. The sample of 628 is considerably higher than both the number of items (Bryman & Cramer, 2001) and the minimum required for scale development, regardless of item count (Tabachnick & Fidell, 2007).

Study Group
As in the original scale, the sample group of the study consisted of students enrolled in a university and having at least one semester of distance education experience. The students were thoroughly informed

about the objectives and scope of the study, ensuring they understood its purpose. Participation was entirely voluntary, with students providing their informed consent before taking part in the research. A total of 628 students enrolled in different departments participated in the study (Table 1.).

Table 1.
Descriptive Statistics of Participants

		Pilot		Study	
		f	%	f	%
Gender	Male	52	50.5	266	42.4
	Female	51	49.5	362	57.6
Grade	First	28	27.2	195	31.1
	Second	33	32.0	194	30.9
	Third	19	18.4	89	14.2
	Fourth	23	22.3	145	23.1
	Fifth	-	-	5	0.8
Department	Faculty of Education	25	24.3	164	26.1
	Faculty of Engineering	26	25.2	161	25.6
	Faculty of Health Sciences	22	21.4	129	20.5
	Faculty of Humanities and Social Sciences	11	10.7	88	14.0
	Faculty of Science	19	18.4	86	13.7
Total		103	100	628	100

Participants in the study were 266 (42.4%) males and 362 (57.6%) females. All of the students are studying at the undergraduate level.

Data Collection
In the study, the linguistic equivalence of the scale was first read aloud to 15 students and feedbacks were received. After the pre-pilot application, a pilot application was carried out with 103 students and the analysed scale items were made ready for the actual application. The data obtained in the study were collected via a Google form. The form sent to students who have attended at least one semester of distance education can be filled out in 10 minutes.

Ethical Dimension of the Study
In order to adapt the scale to the Turkish language, permission was first obtained from the researchers who developed the original scale via e-mail for the validity and reliability study. Then, the necessary permissions were obtained from the ethics committee of the university. The research was conducted according to the Principles of the Declaration of Helsinki. After obtaining permission from the institution where the study was conducted, it was stated to the students before starting the study that personal data would not be collected through the form and that the study was conducted only for scientific purposes.

Data Collection Tool
In this study, the 'Student Engagement Scale for Online Courses' developed by Inder, (2021) was adapted into Turkish. The original scale consists of 27 items in a 5-point Likert scale with six different engagement dimensions: skill, emotional, cognitive, participation, performance, and valuing the course. The items in the scale are scored from 1 to 5, with 1: strongly disagree and 5: strongly agree. The items in the scale should measure only one behavior (Seçer, 2015). However, the statement "Feel excited in attending all sessions/ Feel energetic during class" in item 24 in the original scale was included in the study as separate items in line with expert opinions, since it measures 2 different behaviors. So the total

number of items was 28. There is no reverse item in the scale. The maximum score that can be obtained from the scale is 140 and the minimum score is 28.

The original scale was edited in line with expert opinion in order to ensure content and face validity. Experts expressed their opinions in terms of both language validity and content and face validity. CFA analysis was applied to determine whether the scale was validated or not. CFA, reliability analyses and validity analyses were performed using IBM SPSS Statistics (27.0), JASP (0.18.3.0), AMOS (24.0) and Microsoft Office Excel (Version 2016). The path diagram is shown in Figure 2.

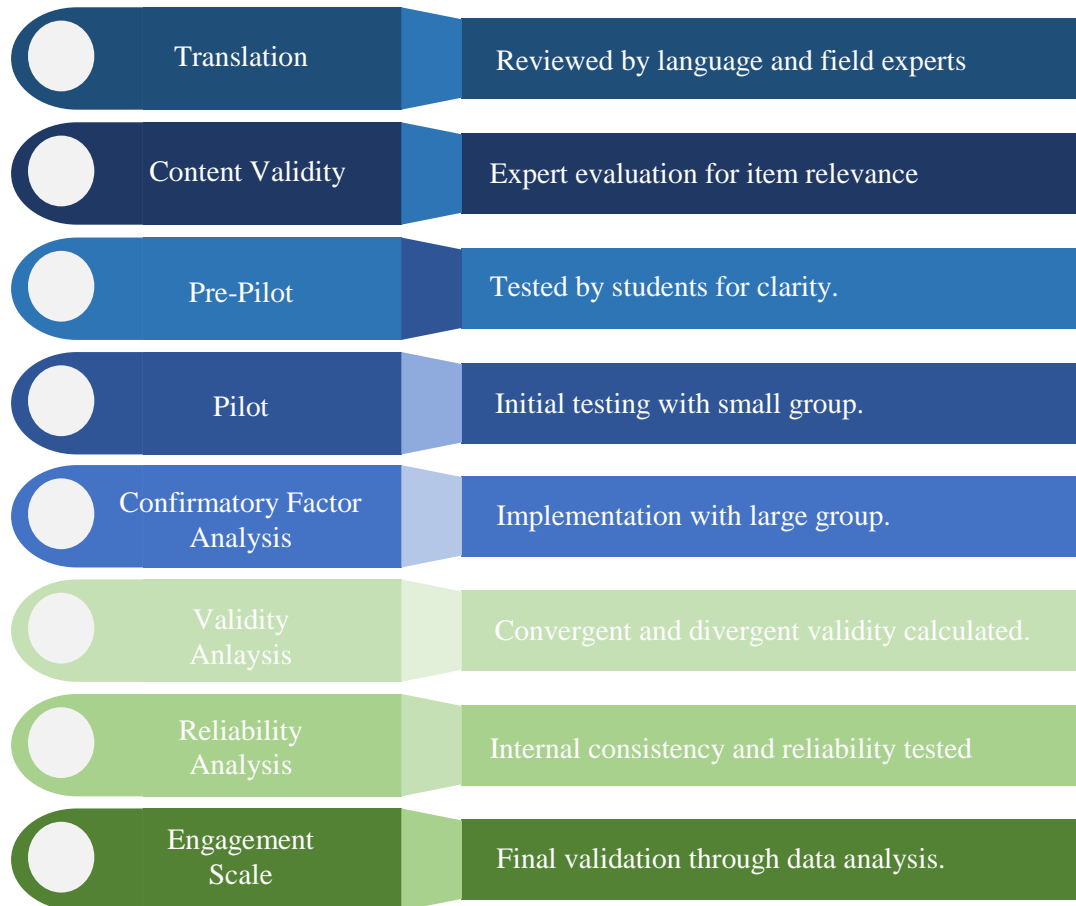| Translation | Reviewed by language and field experts |
Content Validity	Expert evaluation for item relevance
Pre-Pilot	Tested by students for clarity.
Pilot	Initial testing with small group.
Confirmatory Factor Analysis	Implementation with large group.
Validity Anlaysis	Convergent and divergent validity calculated.
Reliability Analysis	Internal consistency and reliability tested
Engagement Scale	Final validation through data analysis.

Figure 2. Adaption Process

Within the scope of adaptation, permission was obtained from the author and then scale adaptation procedures were initiated. In the sample group of the scale, care was taken to include different participants such as those in engineering, education and health. It was ensured that the participants had experience of online courses for at least one semester. In the adapted scale, the dimensions were named similarly to the original scale. The adaptation process of the SEOLES began with the translation stage, where 2 field experts, 2 English language experts, and 1 Turkish language expert contributed to the translation of the scale. Next, content validity was ensured by receiving feedback from 5 field experts, 2 English language experts, and 1 Turkish language expert. In the Pre-Pilot phase, the items were read aloud to 15 students, and necessary revisions were made based on their feedback. After revisions were made regarding the fluency and comprehensibility of the items through translation and pre-pilot application, a pilot study was conducted with 103 participants. After the reliability analyses related to the scale items in the pilot study, no problems were observed and then the actual research data were collected from 628 participants through online forms.

In the content validity stage, in line with the expert opinions, item 24 was written as 2 separate items since it represented different behaviours. The scale, which was finalized after the pilot applications, was subjected to validity and reliability analyses with the actual application.

Data Analyses

Confirmatory factor analysis, validity analysis and reliability analysis were conducted in the scale adaptation.

Confirmatory Factor Analysis (CFA)

To test the factor structure of the SEOLES scale in the Turkish language, to determine whether the adapted scale structure was confirmed or not, CFA was carried out. The path diagram obtained by the cfa analysis performed with the Amos programme is shown in Figure 3.
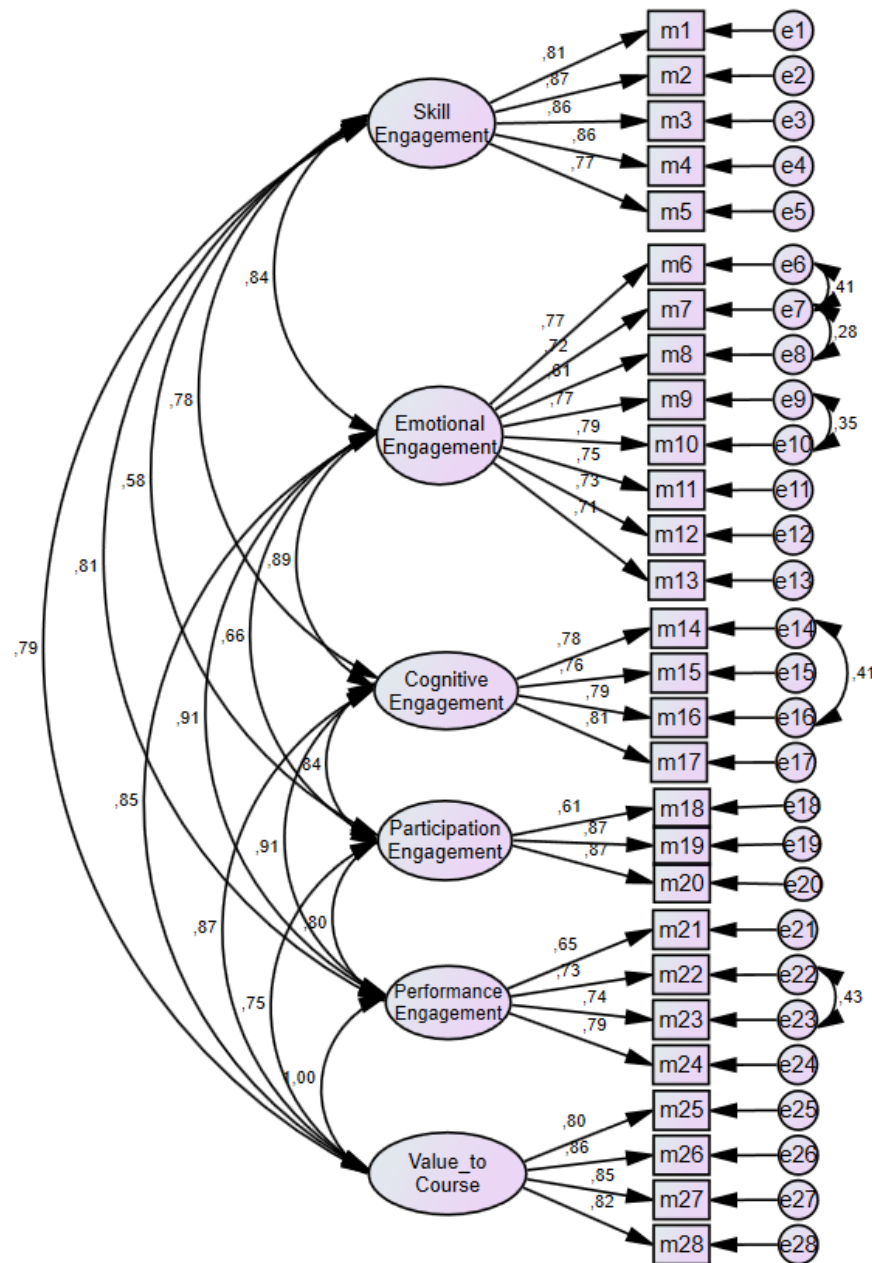

Figure 3. Confirmatory Factor Analysis

When the path analysis in Figure 3 is examined, it is seen that the standardised regression coefficients vary between 0.611 and 0.870. In the literature, it is stated that this value should be at least 0.5 (Büyüköztürk, 2002), which shows that the findings obtained from the study meet the criteria. In scale development or adaptation studies, modifications suggested by CFA are used to obtain expected fit indices (Çokluk, 2014; Seçer, 2018). However, these modifications should be theoretically supported as

well as showing high covariance (Bryne, 2016). It is natural to find covariance between the error terms of items that measure the same construct or have similar expressions (Brown, 2015). In the research, among the items with high covariances, covariances were formed between items 6-7, 7-8 and 9-10 in the emotional engagement dimension, items 14-16 in the cognitive engagement dimension and items 22-23 in the performance engagement dimension (Figure 3.). The fact that the created covariates are in the same dimension and include similar expressions such as interest-willingness, excitement-energy, focusing-concentration, and interaction-participation shows that they are supported theoretically.

As a result of the analysis fit indices were found as RMSEA=.063, CFI=.941, AGFI=.852, GFI=.880, NFI=.919, TLI=.933 (Table 2). These findings show that the fit indices of the scale are between acceptable fit index values. The results show that the data obtained from the study meet the criteria of the criterion ranges specified in the literature (Kline, 2011; Tabachnick & Fidell, 2013).

Table 2.
Confirmatory Factor Analysis Fit Indices

Indices	Reference Value		Value	Result
	Acceptable	Good		
CMIN/DF	$3 < \chi2/sd \leq 5$	$0 < \chi2/sd \leq 3$	3.451	Acceptable
RMSEA	$.05 \leq RMSEA \leq .08$	$0 \leq RMSEA \leq .05$	.063	Acceptable
CFI	$.90 < CFI \leq .94$	$.95 < CFI \leq 1$	.941	Acceptable
AGFI	$.85 < AGFI \leq .89$	$.90 < AGFI \leq 1$	.852	Acceptable
GFI	$.85 < AGFI \leq .89$	$.90 < AGFI \leq 1$	.880	Acceptable
NFI	$.90 < NFI \leq .94$	$.95 < NFI \leq 1$	.919	Acceptable
TLI	$.90 < TLI \leq .94$	$.95 < TLI \leq 1$	.933	Acceptable

When Table 2 is analysed, it is seen that the scale shows an acceptable fit.

Structure Validity

Convergent and divergent validity values were analysed to ensure the construct validity of the scale. Convergent validity is a criterion that assumes that the items in the scale are related to each other and to the factor they form. Divergent validity means that the items are related to the factors they belong to with a high value compared to other factors. In order to ensure the convergent validity of a scale, the Composite/Construct Reliability (CR) values of the scale should be greater than the Average Variance Extracted (AVE) values. In addition, the CR value is expected to be 0.70 or higher and the AVE value is expected to be 0.50 or higher (Fornell & Larcker, 1981). It has been stated that the Fornell-Larcker method for divergent validity is not a discriminant validity criterion and instead the multi-dimensional heterotrait-monotrait (HTMT) analysis gives more accurate results (Henseler et al., 2016). It is stated that the correlation threshold value for the HTMT value should be 0.90 (Gold et al., 2001; Teo et al., 2008). These values for the scale are given in Table 3.

Table 3.
AVE, CR and HTMT Values of Dimensions

	CR	AVE	1	2	3	4	5	6
1. Skill Engagement	0.921	0.699	1					
2. Performance Engagement	0.818	0.531	0.868	1				
3. Value to Course	0.900	0.692	0.777	0.880	1			
4. Participation Engagement	0.833	0.631	0.633	0.706	0.848	1		
5. Cognitive Engagement	0.865	0.615	0.805	0.893	0.880	0.810	1	
6. Emotional Engagement	0.902	0.537	0.804	0.861	0.863	0.780	0.974	1

When Table 3. is analysed, it is seen that the CR values of the scale are higher than 0.7, AVE values are higher than 0.5 and CR values for each factor are higher than AVE values, thus convergent validity conditions are met. The HTMT values obtained in the study generally remained below the recommended thresholds, supporting discriminant validity (Henseler et al., 2015; Kline, 2016). However, the HTMT value between the constructs of Cognitive Engagement and Emotional Engagement was found to be 0.974, exceeding the 0.90 threshold suggested in the literature. This finding suggests that these two constructs may be conceptually very closely related. Nevertheless, considering that discriminant validity was achieved among all other dimensions and that these two constructs are theoretically defined as distinct in the conceptualization of the scale, this situation has been acknowledged as a limitation. However, it was included in the analyses on the grounds that it does not compromise the overall validity of the scale.

Reliability Analysis
In order to test the reliability of the study, various tests were performed. In this context, Cronbach's Alpha internal reliability coefficient and two-half reliability coefficient were calculated for the scale consisting of 28 items and each dimension. In the scale adaptation process, a pilot study was conducted with 103 students before the actual application. In the scale adaptation process, a pilot study was conducted with 103 students before the actual application. In the pilot study, Cronbach's Alpha value was found to be .972, and the two-half reliability was .951 for dimension 1 (first 14 items) and .945 for dimension 2 (last 14 items). Since these values were higher than 0.70, the actual implementation was started (Büyüköztürk, et al., 2013). The results obtained as a result of the implementation are shown in Table 4.

Table 4.
Internal Consistency and Split-Half Reliability Analysis

Dimensions		Number of items	Cronbach Alpha
Engagement Scale		28	0.968
Skill Engagement		5	0.919
Emotional Engagement		8	0.904
Cognitive Engagement		4	0.876
Participation Engagement		3	0.814
Performance Engagement		4	0.837
Value to Course		4	0.898
Split-Half	1. half	14	0.945
	2. half	14	0.945

According to the results shown in Table 4, the Cronbach's Alpha internal consistency coefficient of the scale is 0.968. According to the findings obtained for the dimensions, the lowest reliability coefficient was found to be 0.814 and the highest was 0.968. Two half-reliability coefficients of the scale were found as 0.945 for the first part and 0.945 for the second part. The whole scale, its dimensions and the two-half reliability results show that the scale is reliable.

Conclusion and Discussion

Student engagement plays a critical role in an effective and efficient learning experience in online learning environments (Dixson, 2015). However, engagement is a multidimensional process that is difficult to measure (Trowler & Trowler, 2010). Student engagement is not only access to course content or being active in the course process, but also includes multidimensional elements such as interaction, interest level, use of learning materials, and communication with other students (Coates, 2006). The exploration of student engagement at various levels can provide an opportunity to improve the educational processes in online learning environments. In this study, the 'Student Engagement for Online Courses' scale developed by Inder, (2021), which was evaluated as the most comprehensive as a result of examining different scales for engagement in the literature, was adapted into Turkish as 'Student Engagement in Online Learning Environments Scale'.

The original study and the adaptation study were conducted with undergraduate students. The original study included students who had been studying distance education for at least 2 months and the adaptation study included students who had been studying synchronous or asynchronous distance education for at least one semester. Therefore, it is recommended to apply the scale with undergraduate students with distance learning experience. The increase in the scores obtained from the scale indicates an increase in participation.

The adapted SEOLES consists of 28 items and six dimensions named as skill engagement, emotional engagement, cognitive engagement, participation engagement, performance engagement and value to course. Skill engagement refers to students' willingness to spend time and effort to complete learning materials and to fulfill these tasks (Dixson, 2015; Purinton & Burke, 2019). Emotional engagement refers to connecting with other participants in the learning environment through classroom activities (Black & Allen, 2018). While cognitive engagement reflects the student's capacity to respond to learning activities and fulfil activities (Fredrick et al., 2004; Park & Yun, 2017), participation engagement is expressed as students' attention to the learning process and striving to achieve goals (Dixson, 2015). The participation engagement dimension is related to interacting with peers and enjoying the course content (Hendelsman et al., 2005). Another dimension, the value to course, directs students' attention to achieving learning outcomes and feeling connected to the environment through the value arising from success (Graeff, 2010).

Studies in the literature have mostly associated the concept of engagement with academic achievement (Vytasek et al., 2020). However, the reviewed studies show that there is a moderate positive relationship between academic achievement and engagement (Lei et al., 2018) and the results of the studies are not consistent (Sulla, 2023). This shows that achievement alone is not enough to measure engagement. However, it is vital to reliably measure engagement for an effective and efficient learning process (Sulla, 2023). At this point, different dimensions of the concept of engagement should be taken into consideration (Gunuç & Kuzu, 2015).

Unlike the existing scales in the literature that measure engagement in online courses with limited dimensions (Burch et al., 2015; Ergün & Usluer, 2015; Sulla et al., 2023), the scale adapted in this study provides the Turkish literature with a tool that measures engagement in the online learning process more comprehensively. In addition, the methodology of the study is strong. In addition to pilot studies and confirmatory factor analysis, the study was supported by construct validity. The study provided diversity by collecting data from different departments and educational levels with distance learning experience.

As a result, this study provides a measurement tool to analyse different dimensions of student engagement in online learning environments. Students' engagement in the dimensions of skill engagement, affective engagement, cognitive engagement, participation engagement, performance engagement and value to the course plays a critical role in achieving meaningful learning experiences in online courses. These dimensions of student engagement support the learning process in a wide range from interacting with learning materials to social bonding, enabling students to focus on the course and achieve their goals. The findings of the study can provide guidance for higher education institutions in terms of self-correction and restructuring of online courses to increase student engagement. Regularly measuring student engagement and integrating these measurements into the design of online courses will increase the efficiency of education and contribute to providing students with a richer learning experience.

Limitations and Future Research

The study has some limitations that need to be taken into consideration. First, it is important to note that our results are based on a single convenience sample and are limited by the sociocultural characteristics of the university settings in which the study was conducted. Since the participants in the study were at the university level, validity and reliability studies should be conducted for its application at the K-12 level. Although the sample was selected to include students from different departments and levels, the participants used the same learning management system. Reporting studies by selecting participants who

experience different learning management systems as a sample may make the scale more generalizable. Also, as usual, a larger and more diverse sample would lead to stronger and more generalizable results.

In the study, the HTMT values generally remained below the recommended threshold, supporting discriminant validity. However, the HTMT value of 0.974 between Cognitive Engagement and Emotional Engagement exceeded the threshold. Although this is considered a limitation, it was included in the analysis by preserving the theoretical structure of the scale. It is recommended that future studies focus on achieving a clearer distinction between these two dimensions.

Future studies could investigate the online participation of university students in a more diverse sample to confirm possible differences. SEOLES can help educators with what researchers should consider before designing an online course. SEOLES, as adapted in this study, can be used to provide multidimensional measures of teaching effectiveness beyond traditional student evaluations of university online courses. It can be useful for evaluating one or more dimensions of individual or institutional courses and receiving feedback. With various studies involving structural equation models, the effects of different dimensions on learning outcomes such as academic achievement, satisfaction, and motivation can be investigated.

SEOLES provides information beyond the software used to run online courses. It goes beyond the quantitative information provided by learning management systems, such as the number of logins, number of messages, grades, number of emails, etc., to address students' intellectual effort, skills, performance, and engagement, as well as the affective/emotional components of learning. In conclusion, the SEOLES scale provides an easy, valid, and reliable way to enhance students' online learning experience.

References

Abbasi, M., Ghamoushi, M., & Mohammadi, Z. Z., (2023). EFL learners' engagement in online learning context: development and validation of potential measurement inventory. *Universal Access in the Information Society*, 1-15. https://doi.org/10.1007/s10209-023-00993-0

Agustina, E., & Cahyono, B.Y. (2017). Perceptions of Indonesian Teachers and Students on the Use of Quipper School as an Online Platform for Extended EFL Learning. **Journal of Language Teaching and Research, 8**, 794-800. https://doi.org/10.17507/JLTR.0804.20

Aldossary, K. (2021). Online Distance Learning For Translation Subjects: Tertiary Level Instructors' And Students' Perceptions In Saudi Arabia . *Turkish Online Journal of Distance Education* , 22 (3) , 95-109 . DOI: 10.17718/tojde.961821

Allen, I. E., Seaman, J., Poulin, R., & Straut, T. T. (2016). Online report card: Tracking online education in the United States. http://www.onlinelearningsurvey.com/reports/changingcourse.pdf Erişim tarihi: 10.04.2023

Anastasakis, M., Triantafyllou, G., & Petridis, K. (2021). Undergraduates' barriers to online learning during the pandemic in Greece. *Technology Knowledge and Learning*, *28*, 1383–1400. https://doi.org/10.1007/ s10758-021-09584-5.

Bedrule-Grigoruta, M. V., & Rusu, M. L. (2014). Considerations about e-Learning tools for adult education. *Procedia-Social and Behavioral Sciences*, *142*, 749-754. doi: 10.1016/j.sbspro.2014.07.610

Bliss, C. A., & Lawrence, B. (2009). From posts to patterns: A metric to characterize discussion board activity in online courses. *Journal of Asynchronous Learning Networks, 13*(2), 15–32.

Büyüköztürk, Ş. (2002). Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı. *Kuram ve Uygulamada Eğitim Yönetimi, 32*(32), 470-483.

Büyüköztürk, Ş. & Çakmak, E.& Akgün, Ö.& Karadeniz, Ş. & Demirel, F. (2013). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi Yayınları

Brown, M., Hughes, H., Keppell, M., Hard, N., & Smith, L. (2015). Stories from students in their first semester of distance Learning. *The International Review of Research in Open and Distance Learning*, 16(4), 1–17

Brown, T. A. (2015). Confirmatory Factor Analysis for Applied Research (2nd ed.). The Guilford Press.

Brunton, J., Brown, M., Costello, E., & Farrell, O. (2018). Head start online: flexibility, transitions and student success. *Educational Media International*, 55(4). https://doi.org/10.1080/09523987.2018.1548783

Bryman, A. & Cramer, D. (2001). Quantitative data analysis with SPSS release 10 for Cole, D.A. (1987). *Utility of confirmatory factor analysis in test validation research. Journal of Consulting and Clinical Psychology,* 55, 1019-1031.

Burch, G. F., Heller, N. A., Burch, J. J., Freed, R., & Steed, S. A. (2015). Student engagement: Developing a conceptual framework and survey instrument. *Journal of Education for Business*, *90*(4), 224-229. https://doi.org/10.1080/08832323.2015.1019821

Byrne, B. M. (2016). Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming (3rd ed.). Routledge.

Cavanaugh, J., Jacquemin, S. J., & Junker, C. R. (2022). Variation in student perceptions of higher education course quality and difficulty as a result of widespread implementation of online education during the COVID-19 pandemic. *Technology Knowledge and Learning*, 1–16. https://doi.org/10.1007/ s10758-022-09596-9.

Derakhshan, A., Kruk, M., Mehdizadeh, M., & Pawlak, M. (2021). Boredom in online classes in the Iranian EFL context: Sources and solutions. **System, 101**, 102556. https://doi.org/10.1016/j.system.2021.102556

Dincer, A., Yeşilyurt, S., Noels, K.A., Vargas L, (2019). Self-determination and classroom engagement of EFL learners: a mixed-methods study of the self-system model of motivational development. *SAGE Open* **9**(2), 1–15 (2019)

Dixson, M. D. (2015). Measuring student engagement in the online course: The Online Student Engagement scale (OSE). *Online Learning*, *19*(4), n4. https://doi.org/10.24059/olj.v19i4.561

Ergün, E., & Koçak Usluel, Y. (2015). The Turkish adaptation of student's engagements scale in online learning environment: A study of validity and reliability. *Educational Technology Theory and Practice*, *5*(1), 20-33.

Farrell, O., & Brunton, J. (2020). A balancing act: A window into online student engagement experiences. *International Journal of Educational Technology in Higher Education*, *17*(1), 1–19. https://doi. org/10.1186/s41239-020-00199-x.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59-109. https://doi.org/10.3102/00346543074001059

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.

Francescucci, A., & Foster, M. (2013). The VIRI (Virtual, Interactive, Real-Time, Instructor-Led) Classroom: The impact of blended synchronous online courses on student performance, engagement, and satisfaction. *Canadian Journal of Higher Education, 43*(3), 78–91. https:// doi. org/ 10. 47678/ cjhe. v43i3. 184676

Getenet, S., Haeusler, C., Redmond, P., Cantle, R., & Crouch, V. (2024). First-year Preservice Teachers' Understanding of Digital Technologies and Their Digital Literacy, Efficacy, Attitude, and Online Learning Engagement: Implication for Course Design. *Technology, Knowledge and Learning*, 1-25. https://doi.org/10.1007/s10758-023-09724-z

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214. https://doi.org/10.1080/07421222.2001.11045669

Gunuc, S., & Kuzu, A. (2015). Student engagement scale: Development, reliability and validity. Assessment and Evaluation in Higher Education, 40(4), 587–610. https:// doi. org/ 10. 1080/ 02602 938. 2014. 938019

Güvenç, H. (2015). Etkin Katilim Ölçeği Geliştirme Ve Uyarlama Çalişmasi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, *16*(1), 255-267. https://dergipark.org.tr/tr/pub/kefad/issue/59451/854142

Hambleton, R. K. (2005). Issues, Designs and Technical Guidelines for Adapting Tests Into Multiple Languages and Cultures. In R. K. Hambleton, P. F. Merenda and C. D. Spielberger (Eds.). *Adapting Psychological and Educational Tests for Cross-Cultural Assessment*. NJ: Lawrence Erlbaum.

Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). A measure of college student course engagement. *The Journal of Educational Research*, *98*(3), 184-192. https://doi.org/10.3200/JOER.98.3.184-192

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115-135. https://doi.org/10.1007/s11747-014-0403-8

Hooper, D., Coughlan, J., & Mullen, M. (2008). Evaluating model fit: a synthesis of the structural equation modelling literature. In *7th European Conference on research methodology for business and management studies* (pp. 195-200).

Horton, W. (2000). *Designing Web Based Training*. New York: John Wiley & Sons.

Hrastinski, S. (2008). What is online learner participation? A literature review. *Computers and Education, 51*(4), 1755–1765. https://doi.org/10.1016/j. compedu.2008.05.005

Inder, S. (2022). Factors Influencing Student Engagement for Online Courses: A Confirmatory Factor Analysis. *Contemporary Educational Technology, 14*(1), ep336. https://doi.org/10.30935/cedtech/11373

Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher Education Research & Development*, 37(1), 58–71. https://doi.org/10.1080/07294360.2017.1344197

Khan, B.H. (1997). *Web-Based Instruction.* New Jersey: Educational Technology Publications Englewood Cliffs.

Kline, B. (2005). *Principles and Practice of Structural Equation Modeling*. Newyork: The Guilford Press.

Koçak, Ö., & Göksu, İ. (2023). Engagement of higher education students in live online classes: Scale development and validation. *TechTrends,* 67(3), 534-549. https://doi.org/10.1007/s11528-023-00849-7

Leach, L., (2016) Enhancing student engagement in one institution, Journal of Further and Higher Education, 40:1, 23-47, DOI: 10.1080/0309877X.2013.869565

Lei, H.; Cui, Y.; Zhou,W. (2018). Relationships between student engagement and academic achievement: A meta-analysis. *Self Identity*, 46, 517–528

Li, M. (2022). Learning Behaviors and Cognitive Participation in Online-Offline Hybrid Learning Environment. *International Journal of Emerging Technologies in Learning (iJET)*, *17*(01), pp. 146–159. https://doi.org/10.3991/ijet.v17i01.28715

Mallman, M., & Lee, H. (2016). Stigmatised learners: Mature-age students negotiating university culture. British Journal of Sociology of Education, 37(5), 684–701. https://doi.org/10.1080/01425692.2014.973017

Matthews, D., Tan, L., & Edwards, D. (2017). *Development of an online engagement scale 2017*. Australian Council for Educational Research (ACER). Retrieved September 10, 2022, from https:// resea rch. acer. edu. au/ higher_ educa tion/ 56/

McMillan, J. H., & Schumacher, S. (2006). Evidence-based inquiry. *Research in education*, *6*(1), 26-42.

Meşe, C., & Dursun, Ö. Ö. (2019). Effectiveness of Gamification Elements in Blended Learning Environments. *Turkish Online Journal of Distance Education*, *20*(3), 119- 142. doi:10.17718/tojde.601914

Meyer, D. K. & Turner, J. C. (2006). Re-conceptualizing emotion and motivation to learn in classroom contexts. *Educational Psychology Review*, *18*(4), 377-390.

Munro, B. H. (2005). *Statistical methods for health care research* (Vol. 1). lippincott williams & wilkins.

Paetsch, J., & Drechsel, B. (2021). Factors influencing pre-service teachers' intention to use digital learning materials: A study conducted during the COVID-19 pandemic in Germany. *Frontiers in Psychology*, *12*, 733830. https://doi.org/10.3389/fpsyg.2021.733830.

Peled, Y. (2021). Pre-service teacher's self-perception of digital literacy: The case of Israel. *Education and Information Technologies*, *26*(3), 2879–2896. https://doi.org/10.1007/s10639-020-10387-x.

Purinton, E. F., & Burke, M. M. (2019). Student Engagement and Fun: Evidence from the Field. *Business Education Innovation Journal*, *11*(2).

Redmond, P., Abawi, L., Brown, A., Henderson, R., & Heffernan, A. (2018). An online engagement framework for higher education. *Online Learning Journal*, *22*(1), 183–204. https://doi.org/10.24059/olj. v22i1.1175.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of psychological research online*, *8*(2), 23-74.

Seçer, İ. (2015). *Psikolojik test geliştirme ve uyarlama süreci: SPSS ve LISREL uygulamaları*. Anı yayıncılık.

Sever, M. (2014). Derse katılım envanterinin Türk kültürüne uyarlanması. *Eğitim ve Bilim*, 39(176). https://egitimvebilim.ted.org.tr/index.php/EB/article/view/3627

Simonson, M., Smaldino, S., & Zvacek, S. (2015). *Teaching and learning at a distance: Foundations of distance education (6th ed.).* Charlotte, North Carolina: Information Age Publishing, Inc.

Skinner, E. A., Kindermann, T. A. &Furrer, C. J. (2008). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*. *69*(3)*,* 493–525. https://doi.org/10.1177/0013164408323233

Sulla, F., Harrad, R., Tontodimamma, A., Limone, P., & Aquino, A. (2023). Italian validation of the online student engagement scale (OSE) in higher education. *Behavioral Sciences*, *13*(4), 324.

Şimşek, Ö. F. (2007). *Yapısal eşitlik modellemesine giriş:(temel ilkeler ve LISREL uygulamaları)*. Ekinoks.

Tabachnick, B.G. & Fidel, L.S. (2007). *Using multivariate statistics.* MA: Allyn& Bacon, Inc

Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems*, 25(3), 99-132. https://doi.org/10.2753/MIS0742-1222250303

Tunga, Y., & İnceoğlu, M. M. (2016). E-öğrenme ortamlarında oyunlaştırma yaklaşımı kullanımının öğrenenlerin motivasyon durumlarına katkısının incelenmesi. In *10th International Computer and Instructional Technologies Symposium*, pp. 620-625.

Vytasek, J.M.; Patzak, A.; Winne, P.H. (2020). Analytics for student engagement. In Intelligent Systems Reference Library: Machine Learning Paradigms; Virvou, M., Alepis, E., Tsihrintzis, G., Jain, L., Eds.; Springer: Cham, Switzerland ; Volume 158, pp. 23–48.

Yıldırım, G., Sökmen, Y., Taş, Y., Dilekmen, M. (2018). Öğrenci katılım ölçeğinin türkçeye uyarlanması: geçerlik ve güvenirlik çalışması. *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, *8*(1), 68-79. https://doi.org/10.24315/trkefd.364039

Yıldız, M. , Kayaduman, H. & Kurşun, E. (2021). The use of gamification elements in open and distance learning (odl) environments. *Kırşehir Eğitim Fakültesi Dergisi*, *22*(3), 1389-1428. Retrieved from https://dergipark.org.tr/en/pub/kefad/issue/64975/836471

Appendices

Appendix 1. Student Participation in Online Learning Environments Scale

Boyut	No	Maddeler
Beceri Katılımı	1.	Bu derse çalışırken yoğunlaşırım.
	2.	Bu ders için tüm çabamı gösteririm.
	3.	Bu ders için çaba ve enerji harcarım.
	4.	Bu ders için yapabileceğim her şeyi yapmaya çalışırım.
	5.	Ders ile ilgili yapmam gerekenleri tamamlamak için sıkı çalışırım.
Duygusal Katılım	6.	Derse karşı istekliyimdir.
	7.	Ders ile ilgili şeyleri öğrenmeye ilgi duyarım.
	8.	Görevleri, ödevleri tamamladığımda kendimle gurur duyarım.
	9.	Tüm derslere katılmaktan heyecan duyarım.
	10.	Ders sırasında enerjik hissederim.
	11.	Derste verilen ödevleri ve görevleri ilgi çekici bulurum.
	12.	Dersi yaşamımla ilgili bulurum.
	13.	Dersteki öğrencileri derse çekme yollarını etkili bulurum.
Bilişsel Katılım	14.	Ders süresince kendimi derse odaklanmış hissederim.
	15.	Derste sınıf içi tartışmalara tüm dikkatimi veririm.
	16.	Ders sırasında iyi konsantre olurum.
	17.	Derste tartışma ve etkinliklere dikkat ederim.
Sosyal Katılım	18.	Birlikte ders aldığım sınıf arkadaşlarımı tanırım.
	19.	Eğitmenle ders sırasındaki çevrimiçi sohbeti ve tartışmayı ilgi çekici bulurum.
	20.	Sınıf arkadaşlarımla ders sırasındaki çevrimiçi sohbeti ve tartışmayı ilgi çekici bulurum.
Performans Katılımı	21.	Dersin sınavlarında başarılı olurum.
	22.	Dersin eğitmeniyle etkileşim içinde olmak çok hoşuma gidiyor.
	23.	Ders sırasındaki sınıf içi etkinliklere katılmak beni mutlu eder.
	24.	Dersteki temel kavramlar açıklığa kavuşturuldu.
Derse Değer Verme	25.	Sınıf içi öğrenme etkinlikleri benim için önemlidir.
	26.	Bu dersteki öğrenme süreci derse değer kattı.
	27.	Bu ders heyecan ve ilgi çekici olarak başlar.
	28.	Bu ders gerçekten önemli bir derstir.