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ATTENTION AND FOCUSIN THE CONTEXT OF MOBILE LEARNING: A SCALE DEVELOPMENT STUDY

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Abstract

Mobile learning is defined as the realization of learning functions in multiple contexts, independent of time and place, with the help of electronic devices. Mobile devices that can be used in education include smartphones, tablet computers, PDAs, laptops or other portable computers, personal digital assistants, audio players, portable game consoles, portable drives and wearable electronic devices. Today, a significant portion of the world's population owns these devices, particularly smartphones and mobile internet access. The use of mobile technology and mobile devices in education is increasing interest in mobile learning. Mobile learning provides individuals with the opportunity for personalization, flexibility, and independence, thanks to the portable features of mobile devices and their facilitation of social interaction and communication. In this context, mobile learning applications significantly support learning.Mobile learning allows all segments of society (low-income and high-income, educated and uneducated) to easily access information. Mobile learning provides students with the convenience of studying without the limitations of time and place. In addition, because students can learn at their own pace, they can understand the subjects better and continue learning. To achieve success in these areas, attention and focus are critical variables for mobile learning. In mobile learning environments, attention and focus are key to a successful learning process for students. In light of all these, this study aims to introduce a scale with proven validity and reliability titled “Attention and Focus Scale in the Context of Mobile Learning” to the literature based on research popularity and need. A total of 300 students studying in relevant departments of vocational schools of a state university in Türkiye were identified as the sample group of the study. The scale development process consisted of three stages: (1) Exploratory Factor Analysis, (2) Replication of Exploratory Factor Analysis with a Different Sample, and (3) Confirmatory Factor Analysis. Based on the analysis results, the scale consisted of 20 items and 5 sub-dimensions. These subdimensions were labeled "external and internal distractions," "focus duration," "tasking management," "self-regulation" and "motivational focus".The scale's internal consistency was calculated using Cronbach's alpha, and the results obtained from this data set were found to have high reliability. As a result, it is anticipated that the developed scale will contribute to the literature and can be used as a sample data collection tool for researchers who will conduct studies on the relevant subject.

Keywords: Mobile Learning, Attention, Focus, Validity, Reliability, Scale Development.care

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INTRODUCTION

There Developing mobile technologies have transformed learning processes in our age by eliminating the time and space limitations of education. In this context, mobile learning is considered in the literature as an effective learning approach that allows individuals to access information anytime, anywhere. Generally speaking, mobile learning encompasses learning activities conducted via smartphones, tablets, laptops, and similar portable devices (Traxler, 2009). Mobile technologies, particularly in the busy academic and social lives of students, offer flexible learning opportunities, increasing individual learning responsibility and allowing students to learn at their own pace.Mobile platforms support collaborative learning by providing opportunities for social interaction, peer-to-peer feedback, and community building (Roschelle et al., 2010). Mobile learning integrates with daily life, encouraging continuous learning habits and strengthening the understanding of lifelong learning (Vavoula & Sharples, 2009).

Sharples, Taylor &Vavoula (2014), argue that mobile learning is not merely a technological innovation but also a form of learning that is a natural part of an individual's life. One of the most significant advantages of mobile learning is that it makes the learning process independent of time and space. This makes learning more accessible, personalized, and continuous. However, these advantages also present some cognitive challenges. Attention and focus, in particular, are important factors that directly impact the effectiveness of mobile learning.Mobile learners frequently encounter environmental and digital distractions. Notifications, social media apps, incoming calls, or external sounds are among the variables that negatively impact attention during learning (Kukulska-Hulme, 2012). In this context, attention and focus skills are critical to the effectiveness of mobile learning. Studies in the literature also support this. In a study conducted with university students, Yıldız (2019) stated that mobile learning increases students' motivation to learn, but they require self-regulation strategies to maintain attention.As a result, mobile learning stands out as a powerful tool in modern education with its features such as accessibility, flexibility, personalization, multimedia use and collaboration support.

To be successful in mobile learning, students need not only technological skills but also skills such as attention management, time planning, and intrinsic motivation. Self-regulated learning skills, in particular, are crucial for the sustainability of mobile learning (Zimmerman, 2002). Students' ability to control their own attention, maintain focus, and manage distractions enhances their mobile learning performance. Therefore, developing attention and focus scales in the context of mobile learning can be an important tool for measuring and supporting these skills.As a result, mobile learning has become a crucial component of today's education systems. However, to increase the effectiveness of this learning style, it's necessary to consider cognitive processes such as attention and focus, and to raise awareness of these areas. Educators should develop supportive strategies to help students develop these skills, ensuring the full potential of mobile learning is realized.

Parsons & Ryu (2006) demonstrated that multitasking in mobile learning environments negatively impacts students' focus and reduces learning performance. While examining the theoretical foundations of mobile learning, Sharples, Taylor &Vavoula (2014) revealed that individuals' ability to cope with environmental distractions is a key factor in mobile learning success. Recent empirical studies have highlighted that attention-enhancing strategies and notification control in mobile learning applications significantly improve students' learning motivation and concentration (Park, 2017; Chen & Chen, 2020). Cakır et al. (2018), examined students' attention levels and learning motivation in mobile learning environments. The study concluded that appropriately designed mobile applications contribute positively to the learning process by reducing distractions.Kaya & Taskın (2020), investigated university students' mobile learning experiences and concentration issues. The study emphasized the need to develop digital literacy and time management skills to overcome the distractions students experience on mobile devices.Demirtas (2021), analyzed the impact of attention and focus on student success in mobile learning environments. The results revealed that students demonstrated higher success in mobile learning when they developed self-regulation skills.These studies highlight the need to develop attention management skills and appropriate technological designs to increase the effectiveness of mobile learning.

In today's rapidly expanding world of mobile learning, measuring and supporting attention and focus skills is critical for improving learning success. In this context, the development of an "Attention and Focus Scale in the Context of Mobile Learning" will make significant contributions to the field. This scale will allow for the systematic identification of external and internal distractions students encounter during the mobile learning process. Thus, educators will be able to minimize students' focus problems by designing learning environments and mobile applications more effectively. Furthermore, this scale will contribute to the development of individualized learning strategies by providing an opportunity to assess students' self-regulation skills and motivation.In this context, the scale will both provide an effective data source for academic research and guide practical applications in the field of educational technologies. Consequently, this scale, with proven validity and reliability, can be evaluated in the literature as an important tool for understanding and providing solutions to the cognitive challenges of mobile learning.

- **Purpose and Important of the Research:**

The purpose of this research is to develop a validated and reliable scale to measure students' attention and focus levels during mobile learning. With the widespread use of mobile technologies in education, students' attention deficits and concentration problems have become significant problems during their learning. Therefore, a measurement tool that can objectively assess attention and focus levels is needed to better understand students' cognitive processes in mobile learning environments and increase learning efficiency. This scale will both provide data for academic research and contribute to the planning of appropriate interventions by identifying students' cognitive needs in educational practices. With all this information, the study aims to make significant contributions to the literature and educational technology practices nationwide.

While the pedagogical aspects of mobile learning have been extensively addressed in the literature, the number of scales that directly measure cognitive processes such as attention and focus in these environments is quite limited. In particular, the lack of comprehensive, cross-culturally valid measurement tools specific to attention and focus in the context of mobile learning is striking in studies conducted worldwide (Park, 2017; Sung, Chang, & Liu, 2016). In this context, the scale to be developed will not only determine individuals' attention levels towards mobile learning but also provide concrete data for educational designers and instructors to create more effective learning environments. Furthermore, this study will provide a methodological basis for future interdisciplinary research analyzing how cognitive processes such as attention and focus interact with mobile learning. In this respect, the study aims to fill a significant gap in the international literature on mobile learning and to offer original contributions to the educational technology literature.

METHOD

This study is a scale development study. To achieve its intended purpose, a literature review was conducted and the theoretical framework for the scale was established. Scale development studies are systematic research processes conducted in the social sciences to make measurable constructs that cannot be directly observed (e.g., attention, attitude, anxiety, focus) (DeVellis, 2016). These studies aim to develop valid and reliable measurement tools, providing standard data collection tools that can be used in academic research and contributing to practitioners' decision-making processes (Cokluk, Sekercioglu & Buyukozturk, 2018).Information regarding the participants and the scale development process, as well as the processes followed, is provided below:

- **Sample Group:**

The sample group of this study consists of a total of 300 students enrolled in various departments of a School of Higher Education at a public university. Among the participants, 54.0% (N = 162) were female, and 46.0% (N = 138) were male. To ensure convenience and accessibility, the purposive sampling method was employed. Purposive sampling refers to the deliberate selection of individuals who are particularly knowledgeable or experienced with the phenomenon of interest, allowing for more in-depth exploration and analysis (Büyüköztürk et al., 2018). Purposive sampling is a sampling method frequently used in qualitative research, based on selecting individuals who are most suitable for the research purpose and rich in information (Büyüköztürk et al., 2018). In this method, participants are selected not randomly but based on specific characteristics predetermined by the researcher. In other words, the researcher consciously chooses whom to select.This sampling strategy was considered appropriate for reaching participants who actively engage in mobile learning environments. The demographic characteristics of the participants are presented in the tables below (Table 1–Table 9).

Table 1. Department

Department	**f**	**%**
Computer Technologies	68	22.6
Machine	65	21.6
Electrical Energy	54	18.0
Urban Planning	46	15.3
Traditional Handicrafts	40	13.3
Civil Aviation	27	9.2
Total	**300**	**100**

The participants of the study were enrolled in six different departments within a School of Higher Education. Among the students, 22.6% (n = 68) were from the Department of Computer Technologies, 21.6% (n = 65) from the Department of Machine and 18.0% (n = 54) from the Department of Electrical Energy. In addition, 15.3% (n = 46) of the participants were studying in the Department of Urban Planning, 13.3% (n = 40) in the Department of Traditional Handicrafts and 9.2% (n = 27) in the Department of Civil Aviation. The distribution of participants by department is presented in Table 1.

Table 2. Classroom

Classroom	**f**	**%**
1st grade	142	47.3
2st grade	158	52.7
Total	**300**	**100**

The sample consisted of students from two different grade levels. Of the total participants, 47.3% (n = 142) were 1st gradestudents, while 52.7% (n = 158) were in their 2st grade. The distribution of students according to their year of study is presented in Table 2.

Tablo 3. Is there an internet connection in your place?

Internet Connection	**f**	**%**
Yes	259	86.3
No	41	13.7
Total	**300**	**100**

Regarding internet access, the majority of participants (86.3%, n = 259) reported that they had an active internet connection, while 13.7% (n = 41) indicated that they did not have access to the internet. This variable is particularly important in the context of mobile learning, as internet connectivity is a fundamental requirement for accessing digital content and engaging in online educational activities. The distribution of participants based on internet access is shown in Table 3.

Table 4. How much time do you spend on average on your mobile-phone daily?

Use mobile phone	f	%
6 hours and above	216	72.0
3 hours a day	43	14.4
2 hours a day	33	11.0
1 hours a day	8	2.6
Total	**300**	**100**

In terms of daily mobile phone usage, the majority of participants (72.0%, n = 216) reported using their mobile phones for 6 hours or more per day. Additionally, 14.4% (n = 43) stated that they used their smartphones for approximately 3 hours daily, 11.0% (n = 33) for 2 hours, and only 2.6% (n = 8) for 1 hour per day. These findings indicate that most students are highly engaged with their smartphones on a daily basis, which suggests a strong potential for the integration of mobile learning in their academic routines. The distribution of participants according to daily smartphone use is presented in Table 4.

Table 5. Mobile phone usage priority

Usage prioity	f	%
Social media	72	24.1
Shopping	68	22.7
Research	60	20.0
Gaming	59	19.6
Other	41	13.6
Total	**300**	**100**

When asked about their primary purpose for using smartphones, 24.1% (n = 72) of the participants reported social media as their main usage priority. This was followed by online shopping (22.7%, n = 68), research and academic activities (20.0%, n = 60) and gaming (19.6%, n = 59). Additionally, 13.6% (n = 41) indicated other purposes such as communication, music or watching videos. These results show that while entertainment and personal use dominate smartphone activity, a significant portion of students also utilize their devices for research, indicating potential for mobile learning integration. The distribution of participants based on smartphone usage priority is presented in Table 5.

- **Data Collection Tool:**

Attention and Focus in the Context of Mobile Learning Scale: In the development phase of the relevant scale, a comprehensive and detailed literature review was conducted to ensure that the scale items were grounded in existing theoretical frameworks and empirical studies. Based on this review, an initial pool of 20 items was created to effectively measure the construct of interest. In addition to these, 5 demographic items were included to capture participants' background characteristics, which might influence their responses. To establish content validity, expert opinions were sought from a diverse panel comprising three subject matter experts, 1 measurement and evaluation specialist, 2 language specialists and 1 psychological counseling and guidance (PCG) expert. This multidisciplinary expert review ensured that the items were clear, culturally appropriate, and aligned with the conceptual framework. Based on the feedback obtained, necessary revisions and refinements were made to enhance clarity and relevance. Subsequently, a pilot study was conducted with a small sample of 15 participants, representing a group comparable to the target population. The pilot application aimed to identify any ambiguous or confusing items from the participants' perspective, allowing for further modifications. Following these adjustments, the revised scale was re-submitted to experts for final validation, resulting in the finalized form of the scale ready for the main data collection. This rigorous process ensured the development of a valid and reliable measurement tool tailored for assessing attention and focus in the context of mobile learning.

Introduction of the Scale: As a result of the relevant tests performed on the findings obtained in the research, a 5-dimensional structure of the scale consisting of 20 items was determined. These dimensions are; the first dimension: *"external and internal distractions"* and consists of 4 items (M16, M02, M11, M18). The second dimension*: "focus duration"* (M17, M04, M09, M14) and consists of 4 items. The third dimension*: "tasking management"* and consists of 5 items (M05, M12, M19, M20). The fourth dimension: *"self-regulation"* and consists of 4 items (M07, M10, M13, M15).The fifth dimension: *"motivational focus"* and consists of 4 items (M01, M03, M06 and M08).

FINDINGS

To analyze the findings, data was initially collected from 300 students. The collected dataset was split in two, and Exploratory Factor Analysis (EFA) was repeated on both datasets to establish a robust factor structure. Confirmatory Factor Analysis (CFA) was then used to provide evidence for the construct validity of the data collection tool. Consequently, the validity and validation of the Attention and Focus in the Context of Mobıle Learning Scale was conducted in two stages. Relevant studies on the validity and reliability of the scale are presented below:

- **Validity Study of the Scale:**

Within the scope of the validity study of the Attention and Focus in the Context of Mobıle Learning Scale, content, and construct validity were evaluated. To assess construct validity, Exploratory Factor Analysis (EFA) was conducted. As a result of EFA, a five-factor structure consisting of 20 items with eigenvalues greater than 1 was identified, explaining 66.91% of the total variance. This level of explained variance is considered satisfactory in the field of Social Sciences, where values above 30% are generally accepted as adequate (Buyukozturk et al., 2018; Balcı, 2022). In addition, according to Hair et al. (2019), a total variance explanation rate above 60% in factor analysis is regarded as strong evidence of construct validity, particularly when the scale includes multiple dimensions. To further clarify the factor structure and to minimize the cross-loadings, a rotation method (such as Varimax) was applied, which helps to identify distinct and interpretable factor groupings (Costello & Osborne, 2005). This rotational step supports the theoretical framework of the scale and contributes to the psychometric soundness of the instrument.

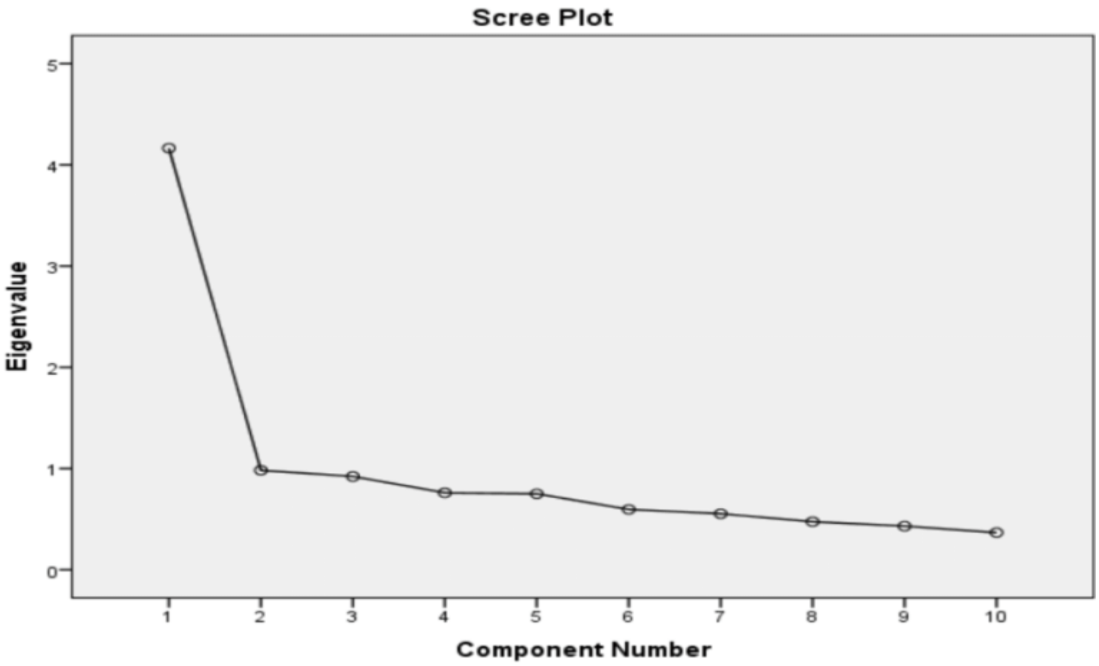

Figure 1. Scale's Eigenvalue-Factor Number Graph

To assess the construct validity of the 20-item scale, several key analyses were conducted, including the determination of the number of factors, the amount of explained variance, and the naming of extracted factors. Initially, Exploratory Factor Analysis (EFA) was employed to identify the underlying factor structure of the scale. The Kaiser Criterion (eigenvalues greater than 1) and the scree plot were utilized to determine the appropriate number of factors (Hair et al., 2019). The total variance explained by the extracted factors was found to be 66.91%, which is considered highly satisfactory in the context of social sciences, where a variance explanation above 50% is generally deemed acceptable (Field, 2018; Büyüköztürk et al., 2018). Following the extraction of factors, Varimax rotation was applied to improve factor interpretability by minimizing cross-loadings and maximizing the variance of squared loadings for each factor (Costello & Osborne, 2005). Based on the rotated factor loadings, each factor was conceptually named in accordance with the theoretical framework and item content. The related tables and findings regarding factor eigenvalues, factor loadings, and explained variance are presented in the sections below.

Table6. Exploratory Factor Analysis Results

Component Initial Eigenvalues Subtraction of Squared Loads Sum Rotation Sum of Squared Loads

	Total	Variance (%)	Cumulative(%)	Total	Variance(%)	Cumulative(%)	Total
1	24.922	42.983	42.987	24.922	42.983	42.987	15.774
2	2.991	4.795	48.972	2.991	4.795	48.972	15.871
3	2.672	3.924	54.091	2.672	3.924	54.091	11.988
4	2.596	2.673	60.618	2.596	2.673	60.618	5.989
5	2.882	3.789	66.912	2.882	3.789	66.912	6.008

As part of the construct validity analysis of the newly developed scale, Exploratory Factor Analysis (EFA) was performed. The results revealed a five-factor structure, with eigenvalues greater than 1, which collectively explained 66.91% of the total variance. The first factor alone accounted for 42.98% of the variance, indicating a strong underlying dimension in the construct being measured. The second, third, fourth, and fifth factors contributed an additional 4.80%, 3.92%, 2.67%, and 3.79% of the variance respectively, which supports the multidimensionality of the scale. According to Hair et al. (2019), a total variance explanation of over 60% is considered acceptable in the social sciences, while Field (2018) emphasizes that the presence of dominant factors followed by smaller but meaningful components suggests a theoretically coherent structure. Additionally, the eigenvalues and the total variance explained demonstrate that each factor carries conceptual significance within the measurement framework. The balance between the strong primary factor and the additional ones supports the internal structure of the instrument. These results confirm the psychometric soundness of the scale and its relevance for measuring attention and focus in the context of mobile learning. Furthermore, the results align with recommended criteria for factor retention and model adequacy in exploratory studies (Buyukozturk et al., 2018; Costello & Osborne, 2005).

- **Examining the Construct Validity of the Scale:**

Validity analyses are a fundamental step in determining how accurately and meaningfully a scale measures the concept it purports to measure. Construct validity is particularly critical for scales measuring multidimensional psychological or behavioral constructs. Exploratory Factor Analysis (EFA), applied in this context, allows for revealing the underlying factors of the scale, determining which items load significantly on these factors, and testing the extent to which the scale aligns with the theoretical structure (Buyukozturk, 2018). The number of factors obtained, the proportion of variance explained, and the consistency of factor loadings are among the fundamental indicators of construct validity. The factor structure resulting from EFA provides strong evidence that the scale represents the construct it purports to measure. Therefore, ensuring construct validity is an indispensable step for the scientific reliability and validity of the developed measurement tool (Hair et al., 2019).

Table 7. Scale Items and Factor Mean and Standard Deviation Values

Item and Factor Dimensions	Rotated factor loading values	X	Sd
Dimension I: External and Internal Distractions			
M16: When someone speaks in the environment during mobile learning, I immediately lose my attention.	0.481	4.35	.987
M02: The physical environment (light, temperature, etc.) negatively affects my mobile learning efficiency.	0.442	4.21	.907
M11:During mobile learning, the movements of people next to me disrupt my focus.	0.761	3.81	.764
M18: I feel uncomfortable when people around me look at my phone.	0.804	4.36	.834
Dimension II: Focus Duration	0.655	4.24	.845
M17: I lose focus soon after starting to work on a mobile device.	0.588	3.28	.938
M04: My time to maintain focus during mobile learning is often very short.	0.809	4.54	1.011
M09: During mobile learning, my focus varies depending on the time of day.	0.789	3.76	.788
	0.588	4.13	.901
M14: I can't concentrate on mobile content for long periods of time, no matter how interesting it is.			
	0.478	3.48	.698
Dimension III: Tasking Management			
	0.809	4.02	.765

M05: I plan which tasks I will do and when during the mobile learning process.	0.714	4.11	.902
M12: I can complete my targeted course tasks while working on my phone.	0.497	4.61	.877
M19: I regularly monitor my tasks during the learning process using a mobile device.	0.693	4.22	.709
M20: I review the work I will do before moving on to the course content.	0.586	4.34	.801
Dimension IV: Self-Regulation	0.893	4.55	.906
M07: I create a specific time plan for myself for mobile learning.			
M10: When I realize that I am distracted while studying, I can control it.	0.743	4.61	1.001
	0.812	4.59	.930
	0.439	4.71	.990
M13: I use my mobile device in a disciplined manner to achieve my learning goals.	0.724	4.62	.832
M15: I monitor my own learning process on mobile platforms and change strategies if necessary.			
Dimension V: Motivational Focus			
M1: Using my mobile device to study encourages me to learn.			
M3: Studying with mobile applications makes me learn the subjects more enthusiastically.			
M6: I motivate myself to achieve success during mobile learning.			
M8: When I lose motivation during the learning process, I make an effort to refocus.			

According to the table above, the calculated total item correlations were found to range from 0.709 to 1.011 for 20 items and 5 factors. In this context, the mean for all items varied between 3.28 and 4.71. Consequently, the overall item mean for the relevant scale was found to be 4.22. According to this result, it was determined that the responses were generally concentrated on the "I agree" option (Buyukozturk et al., 2018).

- **Reliability Study of the Scale:**

In order to test the adequacy of the sample on which factor analysis was applied in the study, the Kaiser Meyer-Olkin (KMO) test, a statistical analysis method, was used. Relevant studies confirm that a KMO value approaching 1 would be appropriate for factor analysis of the data group. Furthermore, a value above .60 is considered among the criteria required for Bartlett test results to be valid and significant (Buyukozturk, et al., 2018; Hutcheson & Sofroniou, 1999; Johnson & McClure, 2004). In line with this information, the KMO value in the study was 0.9347. According to Bartlett's test, it was significant (X^2= 19994.897, df= 67, p<0.01). Consequently, the data were determined to be suitable and reliable for EFA.

Table 8. Results Regarding KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.934
Bartlett's Sphericity Test	Approx.ChiSquare	19994.897
	df	67
	Sig.(*P*)	0.000

The Kaiser-Meyer-Olkin (KMO) measure has a very high value of 0.934, indicating that the data are highly suitable for factor analysis. Bartlett's test of sphericity was significant (χ^2 = 19994.897, p < 0.001), meaning there are correlations between the variables at a level that warrants factor analysis. In the context of mobile learning, these findings demonstrate that the structural relationships underlying cognitive processes such as attention and focus can be analyzed, and the data provide a strong basis for this analysis. This demonstrates that attention and focus in mobile learning environments can be examined holistically and reduced to meaningful dimensions.

- **Confirmatory Factor Analysis:**

Confirmatory Factor Analysis (CFA) is a statistical technique used to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists, as proposed by a theoretical model. It is particularly useful in scale development and in assessing construct validity by verifying whether the data fit a predetermined factor structure (Johnson & Wichern, 2002; Kline, 2016). In this context, CFA serves as a confirmatory tool to validate the dimensionality of a construct, such as attention and focus in mobile learning environments. The results of the Confirmatory Factor Analysis of the scale are presented in the tables below:

External and Internal Distractions Fit Indices:

Tablo 9. External and Internal Distractions Fit Indices

External and Internal Distractions Dimension	**Fit Indices**					
	χ^2/df	**GFI**	**AGFI**	**TLI**	**CFI**	**RMSEA**
	3.31	.962	.945	.911	.926	.009

The Confirmatory Factor Analysis (CFA) results for the "External and Internal Distractions" construct indicate a strong model fit. The chi-square to degrees of freedom ratio (χ^2/df = 3.31) falls within the acceptable range, suggesting a reasonable fit between the hypothesized model and the observed data. The Goodness-of-Fit Index (GFI = .962) and Adjusted Goodness-of-Fit Index (AGFI = .945) exceed the commonly accepted threshold of .90, indicating a high level of model adequacy. Similarly, the Tucker-Lewis Index (TLI = .911) and Comparative Fit Index (CFI = .926) also surpass the .90 criterion, supporting the model's internal consistency and structural validity. Most notably, the Root Mean Square Error of Approximation (RMSEA = .009) is well below the .05 threshold, demonstrating an excellent fit and minimal approximation error. Overall, these fit indices collectively confirm that the proposed factor structure for external and internal distractions is statistically sound and theoretically well-grounded.

Tablo 10. Focus DurationFit Indices

Focus Duration Dimension	**Fit Indices**					
	χ^2/df	**GFI**	**AGFI**	**TLI**	**CFI**	**RMSEA**
	2.77	.942	.935	.901	.906	.008

The Confirmatory Factor Analysis (CFA) results for the "Focus Duration" dimension indicate a good level of model fit. The chi-square to degrees of freedom ratio (χ^2/df = 2.77) is within the acceptable range, reflecting a reasonable correspondence between the model and the data. Both the Goodness-of-Fit Index (GFI = .942) and the Adjusted Goodness-of-Fit Index (AGFI = .935) exceed the .90 threshold, indicating solid model adequacy. The Tucker-Lewis Index (TLI = .901) and Comparative Fit Index (CFI = .906) also surpass the minimum acceptable value of .90, supporting the structural validity of the construct. Importantly, the Root Mean Square Error of Approximation (RMSEA = .008) demonstrates an excellent fit with minimal error. Collectively, these indices confirm that the proposed structure for focus duration is both statistically reliable and theoretically meaningful.

Tablo 11. Tasking ManagementFit Indices

Tasking Management Dimension	**Fit Indices**					
	χ^2/df	**GFI**	**AGFI**	**TLI**	**CFI**	**RMSEA**
	2.99	.952	.939	.921	.916	.009

χ^2/df = ≈ 2.99:
This value is very close to 3 and is within acceptable limits. This ratio indicates that the model fits the data adequately.
GFI = .952 and AGFI = .939:
Both values are well above .90, indicating a good fit for the overall model structure.
TLI = .921 and CFI = .916:
These indices also exceed the .90 threshold, supporting the internal consistency and structural validity of the model.
RMSEA = .009:
This is an extremely low value; a value below 0.05 indicates an excellent fit.
The "Tasking Management" dimension further reinforces the structural validity of the scale, with χ^2/df = 2.99, GFI = .952, AGFI = .939, TLI = .921, CFI = .916, and RMSEA = .009, all pointing to a highly reliable and well-fitting model. These findings confirm that each dimension is statistically robust and theoretically well-supported within the context of attention and focus in mobile learning environments.

Tablo 12. Self-RegulationFit Indices

Self-Regulation Dimension	**Fit Indices**					
	χ^2/df	**GFI**	**AGFI**	**TLI**	**CFI**	**RMSEA**
	3.73	.936	.916	.925	.910	.007

χ^2/df = ≈ 3.73: A value below 3 is generally preferred, but a value below 5 is also considered an acceptable model fit. Here, 3.73 indicates a moderately good fit.

GFI (.936) and AGFI (.916): GFI and AGFI values above 0.90 indicate a good model fit. Here, both are above 0.90 and are quite good.

TLI (.925) and CFI (.910): These two indices are above 0.90, supporting a good model fit.

RMSEA (.007): A value below 0.05 for RMSEA indicates a very good fit. A very low value of 0.007 indicates a very strong model fit.

For the Self-Regulation dimension, the model fit is quite good. Most indices are at very good levels, with only χ^2/df being slightly high but within acceptable limits. The RMSEA value indicates that the model fits the data very well. These results indicate that the model explains the data well and has strong construct validity.

Tablo 13. Motivational FocusFit Indices

Motivational Focus Dimension	**Fit Indices**					
	χ^2/df	**GFI**	**AGFI**	**TLI**	**CFI**	**RMSEA**
	3.54	.926	.926	.935	.900	.008

χ^2/df = 3.54: Slightly above 3 but below 5, indicating an acceptable fit.

GFI (.926) and AGFI (.926): Both are above 0.90, indicating a fairly good model fit.

TLI (.935): Above 0.90, indicating a good model fit.

CFI (.900): The CFI is around 0.90, indicating an acceptable fit.

RMSEA (.008): Very low, well below 0.05, indicating an excellent model fit.

The model fit for the Motivational Focus construct is quite good. All fit indices are generally above acceptable limits, and the RMSEA is very low. While χ^2/df is somewhat high, the model generally fits the data well.

RESULT & SUGGESTION

This study aimed to develop a valid and reliable measurement tool for measuring attention and focus in the context of mobile learning. Following extensive literature reviews, expert opinions, and pretests, the "Attention and Focus Scale in the Context of Mobile Learning," consisting of 20 items and five subscales (External and Internal Distractions, Focus Time, Task Management, Self-Regulation, and Motivational Focus), was developed. Based on the findings, the psychometric properties of the scale were concluded to be adequate for the social sciences.

Exploratory Factor Analysis (EFA) conducted as part of the validity studies revealed that the five-factor structure explained 66.91% of the total variance. This ratio meets the 50% criterion required in social sciences and demonstrates the scale's strong construct validity. Furthermore, the item loadings for each factor were sufficient, and the items were consistent with the theoretical framework. The fit indices obtained in the confirmatory factor analysis (CFA) for each sub-dimension of the scale also support the model's fit to the data. In particular, the RMSEA values below 0.01 across all dimensions demonstrate a near-perfect fit. The GFI, AGFI, CFI, and TLI values, all mostly above 0.90, reinforced the construct's validity.

In terms of reliability studies, the KMO value was found to be very high at 0.934, and the Bartlett test was significant. These results indicate that the sample size and data are suitable for factor analysis. Overall, it can be said that the scale offers a reliable, valid, and multidimensional structure.

Recommendations for practitioners and researchers:

- This developed scale can be used both in academic research and in practice to measure students' attention and focus levels during mobile learning processes.

- Educators, especially those developing mobile learning-based instructional designs, can use this scale to monitor students' attention and focus levels and tailor their learning environments accordingly.

Recommendations for institutions developing educational technologies:

- Developers of mobile learning applications and platforms can use this scale to collect data on users' attention processes and make in-app improvements.

- Content strategies that reduce distractions and increase focus can be developed.

Recommendations for further research:

- Testing the scale across different age groups, education levels, and cultural contexts to test its validity and reliability will increase the scale's overall validity.

- Longitudinal studies can monitor changes in students' attention and focus levels during mobile learning over time.

Relationships between the scale and variables such as academic achievement, learning motivation, and technological literacy can be examined.

In conclusion, the "Attention and Focus in the Context of Mobile Learning Scale" developed as a result of this study contributes to the scientific literature as an important measurement tool in this field. It is believed that the scale has the potential for broad use in both academic and applied studies.

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