Interdisciplinary Journal of Virtual Learning in Medical Sciences

Original Article

Comparing Faculty and Student Acceptance of Mobile Learning in Blended Learning Education: A Cross-sectional Study

Mojtaba Rezaei Rad[1*], Mahdi Roudi[1]

[1]Department of Educational Technology, Sari Branch, Islamic Azad University, Sari, Iran

ABSTRACT

Background: Mobile learning is a key component of blended learning in higher education, particularly in medical education. Understanding faculty members and students' perceptions and acceptance of mobile learning is critical for effective implementation. This study aimed to compare the perceptions and acceptance of mobile learning among faculty members and medical students in a blended learning environment.

Methods: This applied, comparative cross-sectional study was carried out between September 2024 and January 2025 at Islamic Azad University in Mazandaran, Iran, involving faculty members (n = 182) and students (n = 337) from medical disciplines. Using stratified random sampling, 123 faculty members and 181 students were selected for participation. Data were collected using four researcher-developed 30-item questionnaires assessing perception and acceptance of mobile learning. A panel of 10 experts confirmed content validity, and reliability coefficients (Cronbach's alpha) ranged from 0.82 to 0.88. Data analysis included descriptive statistics; one-sample t-tests against the theoretical midpoint (cut-off = 3), independent-samples t-tests with 95% confidence intervals, Hedges' g effect sizes, and Pearson correlation analysis.

Results: Both faculty members and students reported their perception and acceptance scores significantly above the theoretical midpoint ($p < 0.001$), indicating a positive orientation toward mobile learning. There was no statistically significant difference in perception scores between students and faculty members ($p = 0.385$), indicating a similar level of awareness in both groups. However, faculty demonstrated significantly higher acceptance than students ($p < 0.001$, Hedges' $g = 0.53$), reflecting greater readiness, confidence, and willingness to adopt mobile learning. Perception scores were positively correlated with acceptance in both students ($r = 0.62$, $p < 0.001$) and faculty ($r = 0.58$, $p < 0.001$), highlighting the role of perceived value in shaping adoption.

Conclusion: Findings show that both faculty and students hold positive perceptions and acceptance of mobile learning, with faculty members demonstrating greater readiness. Successful implementation requires focused faculty development, student digital readiness training, and adequate technological infrastructure to optimize integration and educational outcomes in medical education.

Keywords: Learning, Mobile Learning, Blended Learning, Technology, Technology Acceptance, Education, Medical

Corresponding author:
Mojtaba Rezaei Rad, Department of Educational Technology, Sari Branch, Islamic Azad University, Sari, Iran.
Tel: +98 9111564712
Email: mojtabarezaeirad@yahoo.com

Please cite this paper as:
Rezaei Rad M, Roudi M. Comparing Faculty and Student Acceptance of Mobile Learning in Blended Learning Education: A Cross-sectional Study. Interdiscip J Virtual Learn Med Sci. 2026;17(1):108-122.doi:10.30476/ijvlms.2026.110068.1367.

Received: 14-12-2025
Revised: 11-02-2026
Accepted: 18-02-2026

Introduction

The widespread integration of digital technologies has accelerated the transformation of teaching and learning practices in higher education (1). The limitations inherent in conventional education, such as temporal and spatial constraints, insufficient opportunities for meaningful human interaction, delays in providing feedback, and learners' reduced motivation, have collectively highlighted the need for more flexible and efficient alternatives (2). In this context, electronic learning, and particularly mobile learning, has emerged as a promising and effective solution (3). However, electronic learning alone cannot fully meet all educational needs, as challenges such as reduced face-to-face interaction and difficulties in classroom management persist (4). Following these developments, rapid advances in information and communication technologies have created broader opportunities to transform educational practices. Reports indicated that institutions adopting modern technologies, through localization and integration aligned with learners' needs, have witnessed significant improvements in the quality and effectiveness of learning (5). Within blended learning environments, mobile technologies further support personalized learning and foster greater motivation and engagement among learners (6).

The concept of blended learning has emerged as an effective approach to integrating face-to-face, electronic, and mobile instruction. It reduces temporal and spatial constraints, enhances interaction between students and instructors, provides access to diverse educational resources, and facilitates timely feedback (7). Moreover, blended learning can reduce costs and improve individualized learning, shifting the teacher's role from content transmission to learning facilitation (8). According to Criollo-C and colleagues (9), mobile learning technologies will become an indispensable component of future educational systems, and the teacher's role will increasingly evolve toward facilitating and guiding learning within mobile environments. Consequently, the development of instructional strategies that effectively integrate mobile technologies is becoming increasingly important.

Qashou (10) further reports that perceived usefulness and perceived attitude are key determinants of the intention to adopt mobile technology, while factors such as ease of use and self-efficacy shape users' attitudes toward these tools. Thus, the acceptance of mobile technologies depends largely on a clear understanding of their benefits and the extent to which learners find them easy to use.

Evidence indicates that factors, such as learner characteristics, digital skills, teacher competencies, organizational support, and educational interactions, significantly influence the success of blended learning environments (11, 12). These factors similarly affect the acceptance of mobile technologies, as successful implementation depends on both users' recognition of their value and their perceived ability to use them with ease (13).

In the field of medical science education, the significance of blended learning (14) and mobile technologies has become increasingly evident. By providing flexible access to theoretical and practical content, this approach enhances the quality of hands-on learning experiences (15). Research indicates that mobile technology acceptance in this domain is directly associated with ease of use, perceived benefits, and digital literacy (16). Due to the demanding nature of medical education, characterized by intensive curricula, limited resources, and time pressures, blended learning has emerged as a valuable educational approach that offers flexibility, increased interaction, access to diverse learning resources, and opportunities for continuous assessment (17). The successful adoption of this approach depends on various factors, including system performance, perceived enjoyment, connectivity, security, digital literacy, and ownership of mobile learning devices (18, 19).

A systematic review conducted by Qureshi and colleagues (20) indicated that mobile learning has played an increasingly important role in enhancing learning skills over the past decade. Their findings suggest that mobile applications have emerged as valuable educational resources, underscoring the importance of actively incorporating mobile technologies into educational settings. In recent years, researchers have shown growing interest in enhancing user experience within mobile learning settings. Emerging findings emphasize the need to design digital environments that prioritize flexibility, customization, and continuous support through mobile technologies in order to promote deeper and more sustained learning (21).

Recent studies demonstrated that integrating mobile technologies with active and interactive learning methods, particularly in medical education, improves clinical performance, increases motivation, and enhances instructional efficiency. This underscores the importance of continuously assessing users' perceptions and satisfaction (22). Given this body of evidence and the increasing role of blended learning and mobile technologies in improving educational quality, examining the perceptions and acceptance of medical science faculty and students regarding these technologies within blended learning environments is essential. However, the scarcity of domestic research limits the availability of comprehensive information; therefore, this study was conducted to address this gap and support strategic educational planning at Islamic Azad University, Mazandaran, Iran.

Within this framework, the present study aimed to address the question of whether there is a significant difference between faculty members' and students' acceptance and perceptions regarding the use of mobile technologies in blended learning environments.

Methods

Study Design and Setting

This study examined the use of mobile learning within a blended learning context in higher education. A cross-sectional design was employed, with data gathered from students and faculty members between October and December 2024. The study was conducted as applied research using a comparative approach. Due to the cross-sectional nature of the design, the findings are limited to identifying associations between variables, and no causal inferences can be made. The temporal precedence of variables cannot be established in this design, and this limitation should be taken into account when interpreting the findings.

Participants and Sampling

The required sample size was determined through an a priori power analysis using G*Power 3.1.9.7, a widely validated tool for statistical power analyses in studies designed to test hypotheses concerning differences between independent groups (23). As the primary objective was to compare perceptions between two distinct populations (faculty members and students), the power analysis was conducted based on this between-group comparison.

To ensure a robust and justifiable estimation of effect size, evidence from previous studies conducted in comparable educational settings was reviewed. A recent study by Zeib and Tariq examined technology acceptance among students and faculty in a blended learning environment using multi-group analysis and reported significant differences between the two groups, with a medium effect size (Cohen's $d = 0.45$) (24). To provide a more conservative basis for sample size estimation and improve the robustness of the analysis, an effect size of $d = 0.40$ was selected. Employing a two-tailed test, an alpha level (α) of 0.05, and a desired statistical power ($1-\beta$) of 0.80, consistent with Cohen's recommended standards, the power analysis indicated a minimum requirement of 100 participants per group (25). To account for potential non-response or incomplete questionnaires, the target sample size was increased by 20%, resulting in a final target of 120 faculty members and 120 students. The achieved sample (123 faculty, 181 students) exceeded this minimum, thereby ensuring sufficient statistical power to detect meaningful differences between the two groups.

Participants were selected using stratified random sampling. The study population was first divided into two strata according to the principal comparison groups: faculty members and students. Proportional allocation was then applied to ensure that the sample reflected the distribution of the target population. Given the population sizes of 182 faculty members and 337 students (approximately 1:1.85), sampling fractions were determined to preserve this proportion. Although the final achieved numbers (123 faculty, 181 students) appear numerically close, the sampling proportions differed, with approximately 68% of faculty members and 54% of students being included. This differential sampling rate preserves the proportional representation of each stratum within the target population, thereby minimizing selection bias.

Stratification was deliberately limited to the faculty/student dichotomy. As shown in Table 1, additional demographic variables, including gender, age, and field of study, were recorded for descriptive purposes; however, these variables were not employed as stratification criteria in the sampling design. This decision was made to maintain adequate statistical power for the primary comparison between faculty and students. Further stratification by gender or academic discipline would have led to excessive fragmentation of the sample (e.g., "male nursing students" or "female medical faculty"), creating subgroups too small for reliable statistical analysis. This approach remains consistent with the study's primary objective.

Faculty members were eligible if they: (a) had taught at least one course using a blended learning approach, defined as a structured combination of face-to-face instruction and technology-mediated learning, during the academic year under investigation; (b) had actively used mobile learning tools or mobile-compatible educational platforms (e.g., learning management systems, mobile applications, or educational messaging platforms) as part of their instructional activities; (c) had a minimum of one academic semester of teaching experience in higher education; and (d) provided informed consent. Faculty members were excluded if they had no prior experience teaching in a blended learning environment, did not use mobile learning tools for instructional purposes, or submitted incomplete or invalid questionnaires.

Students were included if they: (a) were enrolled in at least one course delivered through a blended learning approach during the study period; (b) had prior experience using mobile learning tools for academic purposes, such as accessing course materials, participating in learning activities, or communicating with instructors; (c) had completed at least one academic semester at the institution; and (d) voluntarily agreed to participate and provided informed consent. Students were excluded if they had no experience with blended learning or mobile learning in an academic context, or if their questionnaires were incomplete or showed response patterns indicative of invalid data.

Table 1: Descriptive statistics of demographic characteristics of faculty and student participants

Variable	Category	Students (n = 181)	Faculty (n = 123)
Total sample	n (%)	181 (59.7%)	123 (40.3%)
Gender	Female	122 (67.4%)	43 (35.0%)
Gender	Male	59 (32.6%)	80 (65.0%)
Age (years)	Mean ± SD	21.0 ± 2.1	42.0 ± 6.5
Field / Program	Medicine	72 (40%)	43 (35%)
Field / Program	Nursing	63 (35%)	37 (30%)
Field / Program	Midwifery	46 (25%)	–
Field / Program	Allied Health Sciences	–	43 (35%)
Academic rank	Professor	–	1 (0.8%)
Academic rank	Associate Professor	–	5 (4.1%)
Academic rank	Assistant Professor / Instructor	–	117 (95.1%)

Tools/Instruments

Four researcher-designed questionnaires were employed in this study to evaluate faculty and student perceptions and acceptance of mobile learning within blended learning environments:

Faculty Perception Questionnaire

The Faculty Perception Questionnaire consisted 30 items rated on a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). It was used to assess faculty members' perceptions of mobile learning within blended learning settings. The questionnaire items were adapted from the work of Nikolopoulou and colleagues (26), as well as Liesa-Orús and colleagues (27).

Student Perception Questionnaire

The Student Perception Questionnaire included 30 items on a five-point Likert scale, measuring students' perceptions of mobile learning. Items were adapted from previous research by Biswas and colleagues (28), Klimova and Polyakova (29), Keiper and colleagues (30), and Rezaeirad and Ahangari-Ahangarkalaei (31).

Faculty Acceptance Questionnaire

The Faculty Acceptance Questionnaire consisted 30 items on a five-point Likert scale items used to measure faculty members' acceptance of mobile learning. Items were adapted from Sprenger and Schwaninger (32) and Antonietti and colleagues (33).

Student Acceptance Questionnaire

The Student Acceptance Questionnaire contained 30 items assessed using a five-point Likert scale and was intended to evaluate students' acceptance of mobile learning. The instrument was adapted from Nikolopoulou and colleagues (34) and Rezaeirad and Ahangari-Ahangarkalaei (31).

All four instruments assessing perception and acceptance among faculty and students utilized a five-point Likert response format. Although Likert-scale responses are inherently ordinal, they were treated as interval-level data in this study to facilitate the calculation of descriptive and inferential statistics, including means, standard deviations, t-tests, effect sizes, and Pearson correlation coefficients. This approach is based on the assumption that the distances between consecutive response options are approximately equal, and previous research has shown that five- to seven-point Likert scales can reliably be treated as interval data (5, 36).

In addition, composite scores for each construct were generated by summing responses across multiple Likert-scale items. When Likert items are aggregated into total or mean scores and the number of items is sufficient, the resulting distribution tends to approximate normality based on the Central Limit Theorem. Prior to conducting parametric analyses, the assumptions of normality were examined using skewness and kurtosis indices. The obtained values fell within the acceptable range (±2), supporting the treatment of summed Likert-scale scores as continuous (interval-level) variables for parametric statistical testing.

To facilitate interpretation of the results, one-sample t-tests were performed to compare the observed mean scores with the theoretical midpoint value of 3 on the five-point Likert scale, where 3 represents a neutral response (1 = Strongly Disagree, 3 = Neutral, and 5 = Strongly Agree). Because all four questionnaires employed the same response scale, this midpoint served as a common benchmark for determining whether faculty and student perceptions and acceptance levels were significantly higher or lower than neutrality.

Validity and Reliability - The face and content validity of all questionnaires were confirmed by a panel of 10 experts, including faculty members and experienced researchers in medical education and educational technology. Content Validity Ratio (CVR) was calculated for each item based on Lawshe's (1975) method, in which experts rated items as "essential," "useful but not essential," or "not necessary." Items with CVR values equal to or greater than the minimum threshold recommended for 10 experts (0.62) were retained. In this study, the CVR values of all items ranged from 0.70 to 1.00, indicating strong content validity.

Additionally, Content validity was evaluated using the Content Validity Index (CVI) at both the Item (I-CVI) and Scale (S-CVI) levels. Experts rated each item for relevance on a 4-point Likert scale (1 = not relevant to 4 = highly relevant). Items with I-CVI ≥ 0.78 were considered acceptable. The Average Scale-Level CVI (S-CVI/Ave) was 0.92 for the Faculty Perception Questionnaire, 0.90 for the Faculty Acceptance Questionnaire, 0.91 for the Student Perception Questionnaire, and 0.93 for the Student Acceptance Questionnaire. These results indicate strong content validity and confirm the adequacy of all four instruments for measuring the intended constructs.

Reliability was evaluated by examining the internal consistency of the instruments using Cronbach's alpha coefficient. A pilot study involving 30 nursing and midwifery students, who were not included in the main study sample, was conducted for this purpose. The obtained Cronbach's alpha values were 0.84 for the Faculty Perception Questionnaire, 0.86 for the Faculty Acceptance Questionnaire, 0.82 for the Student Perception Questionnaire, and 0.88 for the Student Acceptance Questionnaire. These coefficients demonstrate good internal consistency and indicate that all four instruments possessed satisfactory reliability.

Data Collection

Data were collected over a three-month period, from October to December 2024, during the first semester of the 2024–2025 academic year. The questionnaires were distributed electronically through official university communication channels and institutional platforms. Upon receipt, all questionnaires were screened for completeness and accuracy. Questionnaires containing more than 10% missing responses were excluded from the analysis to maintain data quality and integrity. Following this screening process, the final dataset contained no missing data.

Data Analysis

Data analysis was performed using SPSS version 26. Both descriptive and inferential statistical techniques were employed. Descriptive statistics, including means and standard deviations, were calculated to summarize participants' responses, while inferential analyses included t-tests, effect size calculations, and correlation analyses to examine relationships and differences among the study variables. To enhance consistency and clarity in reporting, all estimates are presented with their corresponding 95% Confidence Intervals (CIs), and effect sizes are interpreted according to established benchmarks.

For inferential analyses, one-sample t-tests were conducted to compare each group's mean scores against the theoretical midpoint of 3 on the 5-point Likert scale. Independent-samples t-tests were used to compare students and faculty members. Pearson correlation coefficients were calculated to assess the relationship between perception and acceptance, with 95% CIs reported for all correlation estimates.

Appropriate effect size measures were selected based on the type of statistical comparison. For independent-samples t-tests, Hedges' g was used to quantify the magnitude of differences between students and faculty members. Hedges' g was chosen because it corrects for small-sample bias and is particularly suitable when comparing groups of unequal sizes. Given the difference in sample sizes between students (n = 181) and faculty members (n = 123), Hedges' g provided a more accurate estimate of the population effect size. For one-sample t-tests, Cohen's d was calculated, as it is the standard measure for assessing the magnitude of deviation between an observed sample mean and a specified reference value. In this study, Cohen's d quantified the extent to which participants' mean scores differed from the theoretical midpoint of 3 on the Likert scale. Employing

Hedges' g for between-group comparisons and Cohen's d for one-sample comparisons ensured that effect sizes were appropriately estimated and interpreted according to the statistical procedures used.

Prior to conducting parametric analyses, the underlying assumptions were evaluated. Normality was assessed using skewness and kurtosis statistics, with all values falling within the acceptable range of ±2, indicating that the aggregated Likert-scale scores could be treated as continuous variables. Homogeneity of variances for independent-samples t-tests was examined using Levene's test. Statistical significance was established at an alpha level of 0.05 for all analyses.

Ethics - This study was conducted in accordance with research ethics principles and was approved by the National Ethics Committee of Islamic Azad University, Sari, Iran. All participant information was kept confidential, and participants' rights were protected throughout the study. Before enrollment, respondents were informed about the purpose of the study and were assured of anonymity, confidentiality, and voluntary participation.

Results

The descriptive analysis indicated that the study population consisted of two main groups: 182 faculty members and 337 students. Frequency distribution of participants revealed that students comprised the largest proportion of the sample. After coding and preliminary checking, the demographic data were complete, with no invalid or missing values, supporting the quality of the dataset for inferential analyses. These findings suggested that the sample composition was adequate in size for conducting parametric tests, and the relative diversity of the groups allowed for meaningful comparisons. Table 1 summarizes the demographic characteristics of each participant group.

The results presented in Table 1 show that among the 304 participants, 181 (59.7%) were students and 123 (40.3%) were faculty members, indicating a larger representation of students in the sample. Among students, the majority were female (67.4%) with a mean age of 21.0 years (SD = 2.1), reflecting a young and predominantly female student population. In terms of academic discipline, students were distributed across medicine (40%), nursing (35%), and midwifery (25%), indicating a relatively diverse academic background within the student group. In the faculty group, most participants were male (65%) with a mean age of 42.0 years (SD = 6.5), indicating a significantly older population compared to students. Regarding academic rank, the majority of faculty members were assistant professors or instructors (95.1%), with only a small proportion being associate professors (4.1%) or full professors (0.8%), suggesting that most participants were at early to mid-career academic stages. Faculty members were distributed across medicine (35%), nursing (30%), and allied health sciences (35%), demonstrating disciplinary diversity within the group.

As shown in Table 2, the mean perception scores of both students (M = 3.54, 95% CI: 3.46–3.62) and faculty members (M = 3.59, 95% CI: 3.49–3.69) were significantly above the theoretical midpoint of 3 on the 5-point Likert scale ($p < 0.001$). The effect sizes were large for both groups (students: Cohen's d = 1.04; faculty: Cohen's d = 0.97), indicating that the observed differences from neutrality are not only statistically significant but also practically meaningful. These results demonstrate that both students and faculty hold substantially positive perceptions of mobile learning in blended environments, with faculty showing a marginally higher mean score.

As presented in Table 3, the mean acceptance scores for mobile learning were significantly above the theoretical midpoint of 3 for both students (M = 3.47, 95% CI: 3.39–3.55) and faculty members (M = 3.74, 95% CI: 3.64–3.84), with $p < 0.001$ for both groups. The effect size for students was large (Cohen's d = 0.94), while faculty demonstrated a very large effect (Cohen's d = 1.45), indicating a particularly strong and meaningful level of acceptance among faculty.

Table 2: One-sample t-test results for perception scores compared to the theoretical midpoint

Group	n	Mean ± SD	95% CI	Cohen's d	Interpretation
Students	181	3.54 ± 0.52	3.46 – 3.62	1.04	Large
Faculty	123	3.59 ± 0.61	3.49 – 3.69	0.97	Large

*CI: Confidence Interval

Table 3: One-sample t-test results for acceptance scores compared to the theoretical midpoint

Group	n	Mean ± SD	95% CI	Cohen's d	Interpretation
Students	181	3.47 ± 0.50	3.39 – 3.55	0.94	Large
Faculty	123	3.74 ± 0.51	3.64 – 3.84	1.45	Very Large

*CI: Confidence Interval

Table 4: Independent-samples t-test results comparing perception and acceptance between faculty and students

Variable	Mean Difference (Student - Faculty)	95% CI	Hedges' g	Interpretation
Perception	–0.05	–0.19 – 0.09	0.10	Negligible
Acceptance	–0.27	–0.41 – –0.13	0.53	Medium

*CI: Confidence Interval

Table 5: Summary of one-sample effect sizes (Cohen's d) for perception and acceptance by group

Variable	Group	Mean±SD	Cohen's d	Interpretation
Perception	Students	3.540.52±	1.04	Large
Perception	Faculty	3.590.61±	0.97	Large
Acceptance	Students	3.470.50±	0.94	Large
Acceptance	Faculty	3.740.51±	1.45	Very Large

* Cohen's d values represent the magnitude of difference between observed means and the theoretical midpoint of 3. Interpretation follows Cohen's (1988) benchmarks: 0.20 = small, 0.50 = medium, 0.80 = large; SD: Standard Deviation.

Although both groups reported positive acceptance of mobile learning, faculty members demonstrated substantially greater acceptance, reflecting greater confidence and readiness to integrate mobile technologies into their teaching practices.

Before conducting the independent samples t-tests, key assumptions were examined. Normality was supported by skewness and kurtosis values within acceptable ranges for both groups. Homogeneity of variance was evaluated using Levene's test, which was non-significant for both perception ($p = 0.124$) and acceptance ($p = 0.218$), confirming that the assumption of equal variances was met. Based on the independent samples t-tests, there was no statistically significant difference in perception scores between students and faculty ($p = 0.385$). The 95% confidence interval for the mean difference (–0.19 to 0.09) included zero, and Hedges' g = 0.10 indicated a negligible effect size, suggesting that both groups hold comparable views regarding mobile learning in a blended environment. In contrast, a significant difference was found in acceptance scores, favoring faculty ($p < 0.001$). The 95% confidence interval (–0.41 to –0.13) did not include zero, and Hedges' g = 0.53 indicated a medium effect size. As shown in Table 4, these findings demonstrate that faculty members exhibit higher acceptance of mobile learning than students, reflecting greater confidence, readiness, and a more favorable attitude toward its integration into blended learning contexts.

As summarized in Table 5, Cohen's d values were calculated to assess the magnitude of differences between the observed means

Table 6: Pearson correlation coefficients between perception and acceptance of mobile learning by group

Group	r	95% CI	P-value	Interpretation
Students	0.62	0.53 – 0.69	<0.001	Strong
Faculty	0.58	0.46 – 0.68	<0.001	Moderate to Strong

*CI: Confidence Interval

and the theoretical midpoint (cut-off = 3) for perception and acceptance of mobile learning. For perception, students demonstrated a large effect (d = 1.04), indicating that their perception of mobile learning is substantially above the neutral benchmark. Faculty members showed a similarly large effect (d = 0.97), reflecting a positive perception well above the theoretical midpoint. Regarding acceptance, students exhibited a large effect (d = 0.94), demonstrating clearly positive acceptance of mobile learning. Faculty showed a very large effect (d = 1.45), indicating a strong and highly meaningful acceptance compared to the neutral point. These results suggest that both students and faculty not only perceive and accept mobile learning positively, but also that the magnitude of these effects is practically significant. This is particularly evident among faculty regarding acceptance, highlighting their readiness and favorable attitude toward integrating mobile technologies into blended learning environments.

As shown in Table 6, a statistically significant positive correlation was observed between perception and acceptance of mobile learning in both groups. Among students, the correlation coefficient was strong (r = 0.62, 95% CI [0.53, 0.69], p < 0.001), indicating that higher levels of perception regarding mobile learning are associated with greater acceptance of its use in a blended learning environment. Similarly, faculty members demonstrated a moderate to strong positive correlation (r = 0.58, 95% CI [0.46, 0.68], p < 0.001), suggesting that instructors with more favorable perceptions of mobile learning also tend to show higher levels of acceptance. The relatively narrow confidence intervals, which exclude zero, indicate stable correlation estimates, indicating stable and reliable estimates. Overall, these findings highlight the strong association between perception and acceptance of mobile learning and support theoretical frameworks such as the Technology Acceptance Model, in which perceived usefulness and understanding play a key role in shaping individuals' acceptance and adoption of educational technologies.

Discussion

The findings of the present study indicate that both faculty members and students demonstrate positive perceptions and high levels of acceptance toward mobile technologies within blended learning environments. The observed effect sizes ranged from large to very large; according to Cohen's conventional benchmarks (25), these magnitudes reflect substantial practical significance. These findings indicate that the adoption of mobile technologies in medical education is not only statistically significant but also carries substantial educational and operational value. The consistency of these findings with perspectives emphasizing the transformative role of information and communication technologies in higher education (5), as well as evidence supporting the effectiveness of blended learning approaches in enhancing instructional efficiency (7), indicates that the integration of mobile technologies into educational structures may be regarded as a sustainable strategy for improving the quality of medical education.

Faculty members demonstrated slightly higher levels of acceptance compared to students, a difference that may be attributed to their greater digital competence, professional experience, and active role in curriculum development. Research by Rezaei-Rad and Ahangari Ahangar-Kalaei (31) conducted within the same university context demonstrated generally positive faculty attitudes toward mobile learning, with potential implications for shaping educational policies. Moreover, findings reported by Nikolopoulou and colleagues (34) and Antonietti and colleagues (33) suggest that instructors' digital competence constitutes a significant predictor of technology acceptance. From this perspective, faculty members' more comprehensive understanding of the pedagogical applications of mobile technologies, such as promoting flexibility, enabling continuous feedback, and encouraging self-directed learning, may explain their higher acceptance levels. This interpretation is further consistent with Liesa-Orús and colleagues (27), who highlighted the importance of instructors' engagement with technological tools in cultivating twenty-first-century skills.

Although students reported slightly lower levels of acceptance than faculty members, their acceptance remained high and statistically significant. This finding is consistent with established theoretical frameworks of technology acceptance. Qashou (10) and Al-Emran and colleagues (13) identified perceived usefulness and perceived ease of use as primary determinants of mobile learning adoption. The strong and positive relationship identified in the present study between perception and acceptance across both groups provides clear empirical support for these theoretical models. Furthermore, findings by Fagan (18) and Almaiah and Alismail (19), which highlight the influence of system quality, technical infrastructure, and accessibility on student acceptance, may help explain the relative difference in acceptance intensity between the two groups. In other words, the observed difference appears more likely to reflect variations in user experience and practical conditions of use rather than differences in underlying value-based attitudes.

Another significant finding of this study is the absence of a statistically significant difference in perception between faculty members and students. This perceptual convergence suggests that both groups have reached a shared cognitive understanding of the educational value of mobile technologies. This result is consistent with the findings of Sprenger and Schwaninger (32), who argued that sustained use of educational technologies promotes convergence in users' perceptions. Similarly, Keiper and colleagues (30) demonstrated that in flexible learning environments where technology is systematically integrated into instructional design, users tend to perceive its benefits in comparable ways. Therefore, it may be inferred that, within the context under investigation, blended learning has achieved a degree of institutionalization and has become an accepted component of the educational process.

In the field of medical education, the present findings are supported by substantial theoretical and empirical evidence. Mirmoghtadaie and Ahmady (14) and Akbari-Aghdam and colleagues (17) reported that blended learning increases satisfaction and improves learning outcomes among medical students. Masters and colleagues (15) emphasized the importance of mobile technologies in clinical education due to their capacity to provide rapid access to resources and enable learning within authentic contexts. The high level of acceptance observed among both faculty members and students in the present study suggests that these advantages are well recognized within the investigated medical education context. Furthermore, Oo and colleagues (22) demonstrated that integrating mobile platforms into clinical education enhances interaction and instructional effectiveness, a finding that aligns with the results of this study and underscores the importance of targeted investment in mobile learning infrastructures.

Nevertheless, several studies have underscored implementation challenges and potential inequities associated with mobile learning environments. Ghoraishi Khorasgani (20) reported that students' lived experiences during the COVID-19 period were accompanied by technical and psychological challenges, while Zeib and Tariq (24) emphasized issues of educational equity within online platforms. Within this framework, the relative difference in acceptance levels between faculty and students in the present study may reflect disparities in access, academic workload, or variability in digital literacy. Findings of some other studies further indicate that institutional and environmental factors play a decisive role in the successful implementation of blended learning (11, 12). Consequently, strengthening organizational support and developing sustainable technological infrastructures may contribute to further enhancing student acceptance.

From a methodological standpoint, the application of statistical power analysis (23), interpretation of effect sizes according to standardized criteria (25), and the analysis of Likert-scale data in accordance with the previous recommendations (35, 36) reinforce the validity and robustness of the findings and reduce the likelihood of interpretive bias. Accordingly, the results of the present study rest upon a coherent statistical and theoretical foundation.

In conclusion, consistent with both national and international literature, the findings demonstrate that in medical education contexts, positive perceptions of usefulness and ease of use constitute strong predictors of mobile technology acceptance within blended learning environments. The higher acceptance observed among faculty members can be explained by their professional role and digital competence, whereas the convergence in perception between the two groups reflects a shared recognition of the educational value of these technologies. These findings provide an evidence-based foundation for informed policymaking aimed at advancing blended learning development and strengthening technological infrastructures in medical universities.

Limitations and Suggestions

Several limitations should be considered when interpreting the findings of this study. First, the research was conducted solely at Islamic Azad University, Mazandaran Province, which may limit the generalizability of the results to other institutional or cultural contexts. Variations in technological infrastructure, faculty expertise, institutional policies, and student demographics could lead to different patterns of perception and acceptance in other settings.

Second, the study relied on self-reported questionnaires, which introduces potential biases inherent to this data collection method. Although the instruments demonstrated strong validity and reliability, self-reports are susceptible to social desirability effects, recall inaccuracies, and subjective interpretations of questionnaire items. It should be considered that perception and acceptance were measured using self-report instruments with similar Likert-scale structures. Therefore, part of the observed correlation may reflect shared measurement characteristics or conceptual overlap between constructs. While this potential overlap should be acknowledged, no additional factor analysis is required at this stage. Future studies employing more distinct operationalizations or mixed-method approaches may help clarify the independence of these constructs.

Third, the cross-sectional design captures perceptions and acceptance at a single point in time, precluding examination of how these attitudes may evolve with increased exposure to mobile learning or in response to institutional interventions. Longitudinal studies would be valuable for tracking changes over time and identifying causal relationships between variables.

Fourth, potentially influential factors such as prior experience with technology, individual learning preferences, course-specific characteristics, or the type of mobile applications used were not examined. These variables may moderate the relationship between perception and acceptance and warrant investigation in subsequent research. It should also be noted that the observed difference in acceptance between faculty members and students may partly reflect underlying demographic differences, particularly age and gender distribution. Faculty members were substantially older on average than students, and prior research suggests that professional experience and age may influence technology acceptance. Because demographic variables were not statistically controlled in the present study, the observed group differences should therefore be interpreted with caution.

Finally, although the sample reflected demographic diversity, subgroup analyses based on gender, age, or academic discipline were not performed due to sample size limitations and the potential reduction in statistical power. Future research should incorporate multivariable analyses to control for demographic factors such as age and gender, thereby yielding more precise estimates of group differences.

From a practical perspective, these limitations underscore the importance of comprehensive institutional strategies that address both faculty and student needs. Investing in technological infrastructure, providing ongoing professional development for faculty, and implementing structured orientation and training programs for students can help reduce potential acceptance disparities. Furthermore, adopting mixed-method approaches—combining quantitative surveys with qualitative interviews or focus groups may provide a richer, more nuanced understanding of the barriers and facilitators influencing mobile learning adoption.

Conclusion

This study demonstrates that both faculty members and students in medical education hold positive perceptions and acceptance of mobile learning within blended environments. Faculty, however, exhibit significantly higher acceptance, reflecting greater readiness and confidence to integrate mobile technologies into their instructional practices. The positive correlation between perception and acceptance across both groups underscores the foundational role of perceived usefulness in shaping adoption intentions. These findings carry practical implications for educational institutions seeking to optimize blended learning implementation. Faculty readiness can be leveraged to mentor colleagues and model effective integration, while targeted interventions for students including digital literacy training, orientation to mobile platforms, and consistent curricular integration, may help narrow the acceptance gap. Successful adoption of mobile learning ultimately depends not only on individual attitudes but on institutional commitment to providing infrastructure, support, and strategic vision. As blended learning continues to evolve, particularly in demanding fields such as medical education, mobile technologies play an increasingly central role in enabling flexible, accessible, and engaging learning experiences. Ongoing research that examines contextual factors, tracks changes over time, and explores diverse learner populations will further illuminate how mobile learning can be harnessed to its full potential.

Abbreviations

CVI: Content Validity Index
CVR: Content Validity Ratio
I-CVI: Item Level CVI
S-CVI: Scale Level CVI
S-CVI/Ave: Average Scale-Level CVI

Acknowledgments

The authors sincerely thank all faculty members and medical students at Islamic Azad University, Mazandaran Province, for their cooperation and valuable contributions to this study. The authors also acknowledge the use of AI-based tools solely for grammar checking of the final manuscript; no AI tools were used in data generation, analysis, or conceptual development of the study.

Authors' Contribution

MRR conceptualized and designed the study. MR drafted the manuscript. MRR performed data analysis and interpretation and critically revised the manuscript. Both authors approved the final version of the manuscript.

Conflict of Interest

The authors declare no conflicts of interest, whether scientific, financial, organizational, or personal, in the research, data analysis, or manuscript preparation.

Ethical Considerations

The present study was conducted in full compliance with established research ethics principles and in accordance with the guidelines set by the National Ethics Committee. Ethical approval for the study protocol was obtained from the Ethics Committee of Islamic Azad University, Sari, Iran (Approval Code: IR.IAU.SARI.REC.1403.095). All procedures involving participants were carried out with strict attention to ethical standards, including the protection of participants' rights, dignity, and well-being. Participant information was treated with complete confidentiality, and appropriate measures were implemented to ensure data security throughout the research process.

Funding/Support

This research did not receive any financial support from governmental, private, or non-profit organizations.

Availability of Data and Materials

The datasets used and analyzed in this study are not publicly accessible because of ethical considerations and confidentiality obligations. However, the data may be obtained from the corresponding author upon reasonable request and with appropriate justification.

References

1 Alenezi, M., Wardat, S., & Akour, M. The need of integrating digital education in higher education: Challenges and opportunities. Sustainability. 2023;15(6):4782.‌ doi: 10.3390/su15064782.

2 Berezi IU. Virtual learning environment: Redefining higher educational delivery for efficiency and accessibility. Int J Educ Manag. 2025;1(1):451-67.

3 Zeighami M, Abolghasemi M, Sharifirad G. Application of Active Teaching Methods in Medical Education. J Health. 2023;14(3):335-55. [In Persian]

4 Arbab A, Shatat A, Aldada A. Navigating the digital landscape: Addressing challenges in e-learning for the modern era. In: 2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS); 2024 January 28; Manama, Bahrain. USA: IEEE; 2024. doi: 10.1109/ICETSIS61505.2024.10459474.

5 Prajapati A. Transforming education: The revolutionary impact of information and communication technology in 21st century classrooms. Vidya-A J Gujarat Univ. 2025;4(2):408-15. doi: 10.47413/ksy5q983.

6 Ustun AB. Effects of mobile learning in blended learning environments. Bilgi ve İletişim Teknolojileri Dergisi. 2019;1(1):1-14.

7 Sosnova M, Hlianenko K, Sosnova V, Tsyna V, Tsyna A. Enhancing the effectiveness of learning through hybrid education methods. Revista Eduweb. 2025;19(2):95-106. doi: 10.46502/issn.1856-7576/2025.19.02.7.

8 Elgohary M, Palazzo FS, Breckwoldt J, Cheng A, Pellegrino J, Schnaubelt S, Greif R, Lockey A. Blended learning for accredited life support courses - A systematic review. Resusc Plus. 2022;10:100240. doi: 10.1016/j.resplu.2022.100240. PubMed PMID: 35592876; PubMed Central PMCID: PMC9112020.

9 Criollo-C S, Guerrero-Arias A, Jaramillo-Alcázar Á, Luján-Mora S. Mobile learning technologies for education: Benefits and pending issues. Appl. Sci. 2021;11(9):4111. doi: 10.3390/app11094111.

10 Qashou A. Influencing factors in M-learning adoption in higher education. Educ Inf Technol. 2021;26(2):1755-85. doi: 10.1007/s10639-020-10323-z.

11 Moradi R, Arasteh Saleh Kohi M. Enriching the learning Environment based on Mobile Technologies and Investigating its Impact on Students' learning and Academic Engagement in Chemistry. New Educational Approaches.

2024;18(1):47-66. doi: 10.22108/nea.2023.136616.1868. [In Persian]
12 Bahrami F, Nazarzadeh Zare M. The effect of institutional factors on faculty adoption of blended learning. Technol Educ. 2023;17(3):671-82. doi: 10.22061/tej.2023.9693.2887. [In Persian]
13 Al-Emran M, Mezhuyev V, Kamaludin A. Towards a conceptual model for examining the impact of knowledge management factors on mobile learning acceptance. Technol Soc. 2020;61:101247. doi: 10.1016/j.techsoc.2020.101247.
14 Mirmoghtadaie Z, Ahmady S. The Effectiveness of Blended Learning in the Field of Medical Education: Explaining Dimensions and Components Based on Stakeholder Experiences. J Med Educ Dev. 2019;12(33):26-33. doi: 10.29252/edcj.12.33.42.
15 Masters K, Ellaway RH, Topps D, Archibald D, Hogue RJ. Mobile technologies in medical education: AMEE Guide No. 105. Med Teach. 2016;38(6):537-49. doi: 10.3109/0142159X.2016.1141190. PubMed PMID: 27010681.
16 Almulhem JA. Factors, Barriers, and Recommendations Related to Mobile Health Acceptance among the Elderly in Saudi Arabia: A Qualitative Study. Healthcare (Basel). 2023;11(23):3024. doi: 10.3390/healthcare11233024. PubMed PMID: 38063592; PubMed Central PMCID: PMC11080935.
17 Akbari Aghdam H, Najimi A, Zandi-esfahani H. Evaluation of Learning and Satisfaction of Medical Internship Students in Offering Orthopedic Courses: Traditional Education and Blended Education. Iranian Journal of Medical Education. 2022;22:110-19. [In Persian]
18 Fagan MH. Factors influencing student acceptance of mobile learning in higher education. Comput Sch. 2019;36(2):105-121. doi: 10.1080/07380569.2019.1603051.
19 Almaiah MA, Alismaiel OA. Examination of factors influencing the use of mobile learning system: An empirical study. Educ Inf Technol. 2019;24(1):885-909. doi: 10.1007/s10639-018-9810-7.
20 Ghoraishi Khorasgani MS. Students' lived experience of m-learning in the COVID-19 crisis: A phenomenological study of the challenges. TEJ. 2022;16(2):323-38. doi: 10.22061/tej.2022.8400.2658. [In Persian]
21 Pérez-Garcias A, Tur Ferrer G, Villatoro Moral S, Darder-Mesquida A. Flexible Learning Itineraries in Digital Environments for Personalised Learning in Teacher Training. RIED-Revista Iberoamericana de Educación a Distancia. 2022;25(2):173-193. doi: 10.5944/ried.25.2.32326.
22 Oo MS, Schofield S, Aung ST, Thwin MM, Oo SS, Yee KT, Lwin MM, Zakaria AR. Integrating a Mobile-Learning Platform for Enhancing Clinical Teaching: The Learners' Perspective. Int J Learn Teach Educ Res. 2022;21(11):87-111. doi: 10.26803/ijlter.21.11.6.
23 Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav Res Methods. 2009;41(4):1149-1160. doi: 10.3758/BRM.41.4.1149. PubMed PMID: 19897823.
24 Zeib F, Tariq R. Equity challenges in academic satisfaction through online learning platforms and post-COVID implications using multigroup analysis. Educational Technology & Society. 2024;27(4):302-318. doi: 10.30191/ETS.202410_27(4).SP06.
25 Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd ed. New York: Lawrence Erlbaum Associates; 1988. doi: 10.4324/9780203771587.
26 Nikolopoulou K, Gialamas V, Lavidas K. Acceptance of mobile phone by university students for their studies: an investigation applying UTAUT2 model. Educ Inf Technol. 2020;25(5):4139-4155. doi: 10.1007/s10639-020-10157-9.
27 Liesa-Orús M, Latorre-Cosculluela C, Vázquez-Toledo S, Sierra-Sánchez V. The Technological Challenge Facing Higher Education Professors: Perceptions of

ICT Tools for Developing 21st Century Skills. Sustainability. 2020;12(13):5339. doi: 10.3390/su12135339.
28 Biswas B, Roy SK, Roy F. Students Perception of Mobile Learning during COVID-19 in Bangladesh: University Student Perspective. Aquademia. 2020;4(2):ep20023. doi: 10.29333/aquademia/8443.
29 Klimova B, Polakova P. Students' perceptions of an EFL vocabulary learning mobile application. Educ Sci. 2020;10(2):37-45. doi: 10.3390/educsci10020037.
30 Keiper MC, White A, Carlson CD, Lupinek JM. Student perceptions on the benefits of Flipgrid in a HyFlex learning environment. J Educ Bus. 2021;96(6):343-351. doi: 10.1080/08832323.2020.1832431.
31 31. Rezaeirad M, Ahangari Kalaei Z. Comparison of present and future attitudes of medical students and faculty members toward the use of mobile learning: A case study of Islamic Azad University of Mazandaran. Res Curric Plann. 2022;19(74):46-54.
32 Sprenger DA, Schwaninger A. Technology acceptance of four digital learning technologies (classroom response system, classroom chat, e-lectures, and mobile virtual reality) after three months' usage. Int J Educ Technol High Educ. 2021;18(1):8. doi: 10.1186/s41239-021-00243-4.
33 Antonietti C, Cattaneo A, Amenduni F. Can teachers' digital competence influence technology acceptance in vocational education? Comput Hum Behav. 2022;132:107266. doi: 10.1016/j.chb.2022.107266.
34 Nikolopoulou K, Gialamas V, Lavidas K, et al. Teachers' Readiness to Adopt Mobile Learning in Classrooms: A Study in Greece. Tech Know Learn. 2021;26:53–77. doi:10.1007/s10758-020-09453-7.
35 Boone HN Jr, Boone DA. Analyzing Likert Data. J Ext. 2012;50(2):Article 2TOT2. doi: 10.34068/joe.50.02.48.
36 Carifio J, Perla R. Resolving the 50-year debate around using and misusing Likert scales. Med Educ. 2008;42(12):1150-1152. doi: 10.1111/j.1365-2923.2008.03172.x. PubMed PMID: 19120943.