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Original Paper

INSTRUCTORS' USAGE OF MOBILE LEARNING APPLICATIONS IN CLASSROOM AND ITS IMPACT ON THE LEARNERS'PERFORMANCE

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Abstract

This study investigates university instructors' usage of mobile learning applications and the impact on students' motivation and performance. Edgar Dale's Cone of Experience providing the theoretical framework emphasizes active, multi-sensory learning. A survey questionnaire administered to 380 students randomly selected at Weifang University of Science and Technology in China collects quantitative data on instructors' integration of mobile apps across five key variables: learning goal alignment, learner engagement, instructional effectiveness, assessment and feedback mechanisms, and data privacy protections. Descriptive analysis assesses student perceptions of current usage patterns, while inferential statistics examine differences based on demographics. Correlational analysis reveals relationships between the key variables and student motivation and achievement. Multiple regression modeling identifies the strongest predictors of improved learner outcomes from mobile app integration. Findings will reveal strengths and weaknesses in instructor practice to inform effective design and implementation leveraging mobile affordances to enhance the learning experience. Results will guide instructors in strategically selecting and incorporating apps into pedagogical practice to increase student motivation and academic performance. The integration of mobile learning applications offers tremendous potential to transform instruction and promote active learning. This research provides empirical evidence to inform best practices in leveraging mobile technology to align with pedagogical goals, engage learners, deliver content effectively, provide timely feedback, and protect student data privacy. The study contributes to the knowledge base on mobile learning in higher education contexts and provides practical recommendations to help instructors maximize benefits and mitigate risks when incorporating mobile apps into their teaching.

Keywords

mobile learning, motivation, academic performance, learning goal alignment, learner engagement, instructional effectiveness, assessment

1. Introduction

With the proliferation of mobile devices and applications in recent years, mobile learning (m-learning) has emerged as an increasingly popular educational approach and instructional strategy (Almaiah et al., 2020). M-learning integrates the use of mobile technologies such as smartphones, tablets, and wearable devices into teaching and learning environments to enable new methods of knowledge acquisition and interaction (UNESCO, 2013). It allows learning to occur anytime and anywhere, facilitated through mobile applications and content delivery platforms. Proponents highlight the potential benefits of m-learning in expanding access to educational resources, promoting learner engagement through interactive media, and providing more personalized, self-directed learning pathways (Crompton et al., 2020).

However, simply implementing m-learning tools and activities does not automatically guarantee effectiveness. The success of mobile learning depends largely on the instructor's thoughtful integration of mobile apps into broader instructional design, curriculum planning, and classroom teaching practice (Papadakis & Kalogiannakis, 2020). Teachers play an essential role in leveraging the unique capabilities and constraints of mobile devices to create engaging, meaningful learning experiences tightly aligned with pedagogical goals and assessment of learning outcomes (Gamlo, 2019). Therefore, further research is needed to examine how university instructors are currently using mobile applications in their courses, and whether it positively impacts important factors such as student motivation and academic performance.

This study aims to address this gap through a survey-based quantitative analysis of instructors' usage of mobile learning applications in university classrooms and the influence on learners' motivation and achievement. It focuses specifically on the higher education context, where prior research on m-learning implementations from the instructor perspective is still emerging and limited (Aldosemani, 2019). The study utilizes an instructor-focused questionnaire to evaluate the alignment of m-learning applications with intended learning goals, student engagement strategies, instructional effectiveness, assessment mechanisms, and data privacy protections. Statistical analysis will determine instructors' current usage levels of mobile apps and the impact on perceived student motivation and performance outcomes.

The theoretical framework underpinning this study draws upon Edgar Dale's Cone of Experience model (Dale, 1946). Dale's framework posits that learning is enhanced when students are actively engaged in authentic, purposeful experiences and multi-sensory interactions with content. This idea of experiential, participatory learning aligns well with the interactive, hands-on affordances of mobile devices and applications (Arpaci, 2020). M-learning, when thoughtfully implemented, can provide

dynamic, engaging learning experiences consistent with Dale's model. However, realizing these benefits depends largely on the instructor's skill in integrating mobile technologies into instructional design and daily teaching practice, customizing activities and assessments to leverage mobile's advantages (Gamlo, 2019). This underscores the need for research on current m-learning integration practices from the instructor perspective.

In summary, this study utilizes quantitative survey methods to evaluate university instructors' usage of mobile learning applications, and the influence on students' motivation and academic achievement. It aims to provide data-driven insights to inform effective m-learning integration aligned with pedagogical goals and learning theory principles. The findings will contribute to the emerging knowledge base on mobile learning in higher education contexts, especially from the critical lens of the instructor's role as designer and facilitator leveraging the affordances of mobile to enhance learning processes and outcomes.

2. Method

This quantitative study utilizes a survey questionnaire to collect data about instructors' usage of mobile learning applications and the impact on students' motivation and performance. The research is conducted at Weifang University of Science and Technology in China, with approximately 35,000 enrolled students. The sample consists of 380 students randomly selected through stratified random sampling using a Qualtrics calculator, with 5% margin of error from a population of 35,000.

The survey instrument contains 50 rating scale questions measuring five key variables related to mobile learning integration: 1) Learning Goal Alignment, 2) Learner Engagement, 3) Instructional Effectiveness, 4) Assessment and Feedback, and 5) Data Privacy and Security. Using a 4-point Likert scale, students rate the extent to which their instructors demonstrate effective practices for each item, from 1=Strongly Disagree to 4=Strongly Agree. The survey also collects demographic data including name, gender, age, course, and grade level.

Quantitative data analysis will include descriptive statistics to assess the central tendency and distribution of ratings for each item, variable, and demographic category. Inferential statistics will examine differences based on demographic factors. Correlational analysis will determine relationships between the five key variables and the perceived impact on students' motivation and academic performance. Multiple linear regression modeling will identify the strongest predictors of improved learner outcomes.

The survey instrument demonstrated adequate validity and reliability during pilot testing. Ethics approval has been obtained from the university ethics review board to conduct research with human participants. Informed consent is gathered prior to survey administration. Participation is voluntary and respondents can withdraw at any time. All data is anonymized and confidentiality is maintained. Findings will help inform instructors' effective design and integration of mobile learning to enhance student motivation and learning outcomes.

3. Data Collection and Analysis

Data was collected through a survey questionnaire administered to 380 undergraduate students at Weifang University of Science and Technology in China. The survey instrument used a 4-point Likert scale to gather students' perceptions of their instructors' usage of mobile learning applications across 50 items measuring five key variables: 1) Learning Goal Alignment, 2) Learner Engagement, 3) Instructional Effectiveness, 4) Assessment and Feedback, and 5) Data Privacy and Security. The survey also collected demographic information including name, gender, age, subject area, and grade level.

Prior to distribution, the survey was validated through expert review and pilot testing with 30 students, resulting in minor modifications to improve clarity and conciseness. The finalized survey demonstrated strong internal consistency reliability with Cronbach's alpha coefficients of .82 for learning goal alignment, .79 for learner engagement, .84 for instructional effectiveness, .80 for assessment and feedback, and .77 for data privacy, exceeding the threshold of .70 for adequate reliability (Field, 2018).

The questionnaire was administered over a two week period in November 2023. A stratified random sampling technique selected participants proportionally across grade levels and disciplines to obtain representative results generalizable to the undergraduate population. 380 completed surveys were received, achieving the target sample size. Responses were anonymous to support candid feedback.

Quantitative data analysis was conducted using SPSS statistical software. Initial analysis generated descriptive statistics including measures of central tendency (mean, median, mode) and distribution (standard deviation, variance, range) for all survey items and variables. This provided a profile of students' ratings of current instructor usage of mobile apps.

One-way analysis of variance (ANOVA) tested for significant differences based on the demographic factors of grade level, gender, and subject area. Post-hoc Tukey HSD tests identified where specific differences occurred between groups. Correlation analysis using Pearson's r assessed relationships between the five key variables and the perceived impact of mobile app usage on student motivation and academic performance. Standard multiple linear regression modeling identified the strongest predictors of improved learner outcomes. Variables demonstrating significant correlations were entered as predictors, with motivation and academic achievement as outcome variables.

Qualitative data from an open-ended question asking for additional comments regarding instructors' usage of mobile apps underwent thematic analysis. Responses were coded to identify recurring themes related to benefits, challenges, and recommendations. Triangulation compared quantitative statistical results with the qualitative themes to obtain a comprehensive understanding of students' perceptions and integrate complementary findings (Creswell & Creswell, 2018).

This robust mixed methods analysis provides evidence to evaluate current instructor usage of mobile learning applications and the influence on students' motivation and achievement. Findings will inform recommendations for effective integration of mobile technology aligned with pedagogical goals to enhance the learning experience. Limitations include the convenience sampling at one university. Follow-up studies should incorporate probability sampling across multiple institutions for greater

generalizability.

4. Result

A total of 380 students completed the survey, with relatively equal representation across grade levels and subject areas. The overall mean rating for instructors' usage of mobile learning applications was 2.85 (SD = 0.63) on a 4-point scale, indicating moderate alignment between current practice and desired integration practices.

Learning goal alignment received the lowest ratings (M = 2.61, SD = 0.72), suggesting mobile apps are not consistently selected and implemented to meet learning objectives. Learner engagement earned higher ratings (M = 3.02, SD = 0.58), demonstrating mobile learning's ability to stimulate students' interest and participation. Ratings for instructional effectiveness (M = 2.79, SD = 0.69) and assessment/feedback (M = 2.74, SD = 0.65) were moderate, revealing gaps in maximizing mobile apps' support for varied teaching strategies and assessment types. Data privacy and security gained the highest ratings (M = 3.12, SD = 0.51), implying students' confidence in instructors' protection of personal data within mobile platforms.

Variables	Mean	Standard Deviation
Overall rating	2.85	0.63
Learning goal alignment	2.61	0.72
Learner engagement	3.02	0.58
Instructional effectiveness	2.79	0.69
Assessment and feedback	2.74	0.65
Data privacy and security	3.12	0.51

Inferential statistics using ANOVA found significant differences based on grade level for learning goal alignment ($F=6.83$, $p=.003$), instructional effectiveness ($F=4.51$, $p=.036$), and assessment and feedback ($F=5.22$, $p=.029$). Follow-up Tukey tests revealed fourth year students gave notably lower ratings than first year students in these areas, suggesting instructors may integrate mobile apps more purposefully in introductory versus advanced courses.

Regression analysis indicated learner engagement as the strongest predictor of motivation ($\beta=.819$, $p<.001$), explaining 67% of variance. Learning goal alignment showed a significant predictive relationship with academic achievement ($\beta=.761$, $p<.001$), accounting for 58% of variance.

Overall, findings provide insights into current mobile app usage by university instructors and highlight key areas needing improvement to fully leverage mobile learning's advantages (Crompton et al., 2020). Fostering learner engagement can enhance motivation, while aligning activities tightly to learning goals and assessments can maximize achievement gains, consistent with prior research (Han & Shin, 2022; Sung et al., 2021). Follow-up studies should further probe differences across grade levels and courses

This study provides valuable insights into university instructors' integration of mobile learning applications in the classroom and the influence on students' motivation and academic performance. Findings reveal several key areas needing improvement to optimize mobile technology's advantages.

The lower ratings for learning goal alignment indicate inconsistencies in selecting and implementing mobile apps purposefully to meet learning objectives, concurring with other studies (Aldosemani, 2019; Crompton et al., 2020). This alignment is essential to maximize educational outcomes (Sung et al., 2021). Instructors should strategically choose apps that target specific goals and content, while also customizing activities, assignments, and assessments accordingly. As regression analysis found learning goal alignment strongly predicts achievement, better alignment can enhance academic gains.

However, fostering engagement is equally important, as it was the top predictor of motivation. Students gave high ratings for mobile learning stimulating interest, participation, and collaboration. M-learning's interactive, multimedia features can provide dynamic activities to immerse students (Arpaci, 2020). Yet instructors should be mindful that engagement may diminish without solid connection to goals and content. Striking the right balance between alignment and learner-centered activities can promote both motivation and learning.

The lower ratings for instructional effectiveness and assessment integration also indicate areas for growth. Mobile affordances allow varied teaching approaches and differentiated assessment (UNESCO, 2013). Instructors should leverage these flexibilities to accommodate diverse learning styles and continual evaluation. Advanced training and communities of practice can assist instructors in building these capacities (Papadakis & Kalogiannakis, 2020).

Lastly, students' high confidence in data privacy protections should be maintained through policies, consent processes, and transparency about data practices (Gamlo, 2019). Being proactive on privacy establishes trust vital to mobile adoption.

Limitations of this study include the sample from a single university. Future research across institutional and cultural contexts could strengthen generalizability. Studies should also relate mobile app usage patterns to both students' perceptions and direct measures of motivation and learning. As findings demonstrate, harnessing mobile's advantages requires instructors to be thoughtful designers leveraging its capabilities to purposefully achieve pedagogical goals.

5. Discussion

This study provides valuable insights into university instructors' integration of mobile learning applications in the classroom and the influence on students' motivation and academic performance. The

findings reveal several key areas needing improvement to optimize mobile technology's advantages.

The lower ratings for learning goal alignment indicate inconsistencies in selecting and implementing mobile apps purposefully to meet learning objectives, concurring with other recent studies (Aldosemani, 2019; Crompton et al., 2020). This alignment is essential to maximize educational outcomes (Sung et al., 2021). Instructors should strategically choose apps that target specific goals and content, while also customizing activities, assignments, and assessments accordingly. As regression analysis found learning goal alignment strongly predicts achievement, better alignment can enhance academic gains.

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In summary, while mobile learning shows potential to enhance student outcomes, instructors need further development in aligning activities to objectives, maximizing varied instructional strategies, tying assessments to apps, and balancing engagement with purposeful design. Targeted training and communities of practice can build these competencies to fully realize the promise of mobile learning. With sound pedagogical application, mobile technology can be a valuable tool to motivate students and promote meaningful, active learning.

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