Pedagogical Framework of Mobile Learning on Higher Education

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Abstract. Technological developments affect the education system. It can be done that the educational environment is not limited to schools. The use of technology in education, changes in information access methods, and the emergence of ideas like mobile learning. The use of mobile technology can significantly improve how engaging and current education is for the future generation of students. The most intriguing and fulfilling part of this solution is that it gives students of all ages and backgrounds the chance to pursue knowledge that is meaningful and relevant to them. Mobile learning has a lot of potential. Early and frequent technological integration, especially with mobile technology, helps students get ready for modern realities. This paper examines the factors and needs to support mobile learning. The qualitative technique used in this study on the pedagogical framework of mobile learning in higher education comprises focus group talks with educators and students in educational technology department Universitas Negeri Malang. Techniques for gathering data include interviews, documentation, and observation as interview parameters, the questions provided to respondents in the mobile learning application were used. Purposive sampling was used, as well as a sampling technique for objective-based data, with pedagogical framework considerations in adopting and utilizing mobile learning in higher education. Interviewees were lecturers and undergraduate students from Universitas Negeri Malang's educational technology department. The study's findings emphasize the importance of learner autonomy and personalized experiences in mobile learning via High Transactional Distance and Individualized Activity. Giving lecturers and students more control over their learning journey boosts motivation and engagement, resulting in more effective learning outcomes in a variety of educational settings. This study concludes, the mobile learning pedagogical framework can assist educators in designing effective mobile learning activities that correspond with their teaching philosophy and students' requirements. While mobile learning has many advantages, it also necessitates that students and teachers adopt more effective learning and teaching practices across curriculum areas.

Keywords: mobile learning, mobile learning design, higher education.

1   Introduction

Massive digital transformation, making the ability to receive information more dynamic. When technology makes major changes like this, it's not surprising that educators are exploring and experimenting with how it can help solve educational problems or improve student learning performance. [1] Many classrooms today are moving the teacher's position to "student companion" as students assume increased responsibility for their own learning and use technology to collect relevant information. These changes have also increased the usage of mobile technologies for educational reasons.

Mobile learning allows students to access, learn, and create knowledge regardless of time and space. Pupils may check their email, send and receive texts, browse the Internet, and even video chat with others using their hands [2]. Mobile learning has the potential to bridge and connect informal and formal learning experiences, as well as enabling instructional designs that give authentic learning experiences [3]. Collaborative learning is becoming more and more common in mobile learning settings [4].

Regardless of its learning technology model, it is widely used around the world, which highlights its tendency to be a convenient learning/teaching tool in distance education [5]. Mobile learning does have certain limits. In terms of input, output, processing, and memory capacities, mobile devices frequently lack features such as easy-to-use keyboards and screens [6].

Several research have looked into mobile learning's benefits and drawbacks for higher education. Mobile learning, for example, can boost student achievement and motivation, increase knowledge retention, and save expenses. Mobile learning, on the other hand, necessitates those students and instructors adopt more effective learning and teaching practices across curriculum areas. Furthermore, the addictive factor introduced by the pervasive presence of digital gadgets and social media in students' life can jeopardize classroom dynamics.

Students show a high perception of the use of m- learning for different educational activities, universities and schools can take advantage of the advantages of this technology to deliver learning content and improve the learning process. More specifically, m-learning can provide excellent opportunities for students to learn. The challenge now is how small screen interfaces can be maintained as interactive learning [7]. Although the pedagogical framework in higher education has been thoroughly investigated, many gaps in the literature remain, notably in terms of approaches to improve learning outcomes and motivation. Several key discoveries from the literature search shed light on these topics. First, while evaluations have gained significance, their overemphasis may have a negative impact on learning. Effective assessment practices that foster students' active participation are critical for improved learning results. Furthermore, further research is needed to investigate the impact of motivation and learning experiences on students' cognitive learning outcomes in service-learning contexts.

Student evaluation is essential in the teaching and learning process. Instructors must strategically measure the efficacy of their teaching by analyzing how well

students understand course material. Addressing issues such as increased student enrollment, more challenging licensure exams, and a lack of established remediation/mentoring processes can dramatically improve student learning [8]. In course design and content delivery, pedagogical approaches incorporating multiple teaching methodologies and philosophies are critical.

This research focuses on effective assessment practices, the impact of motivation and learning experiences on cognitive results, adaptive learning systems, and collaborative higher education partnerships. Furthermore, educators must become acquainted with a variety of pedagogical methodologies in order to effectively optimize their teaching and improve student learning outcomes. By delving into these topics, the pedagogical landscape in higher education can be expanded to better support students' learning and motivation.

2   Method

The qualitative technique used in this study on the pedagogical framework of mobile learning in higher education comprises focus group talks with educators and students. This method seeks in-depth understanding of their perceptions, experiences, and attitudes towards mobile learning in the context of higher education. Focus group conversations are held with various groups of educators and students to begin collecting qualitative data. These focus groups offer a dynamic and participatory environment in which members can openly discuss their opinions and experiences about mobile learning. The talks, which are guided by a series of open-ended questions, cover a wide range of topics, including the effectiveness of mobile learning strategies, implementation issues, and the impact on teaching and learning experiences.

Aside from focus group talks, one-on-one interviews with chosen instructors and students are performed to delve deeper into individual viewpoints and experiences. These interviews allow participants to give more personal and nuanced ideas, allowing for a more in-depth knowledge of their attitudes and thoughts on mobile learning. To ensure accurate depiction of participants' comments, thorough note-taking and audio recordings are used throughout the qualitative data collection procedure. Thematic analysis is used to identify common themes, patterns, and reoccurring ideas in the transcriptions of the conversations and interviews.

This study technique uses a qualitative approach that includes focus group discussions and interviews to capture the rich and diverse opinions of educators and students on mobile learning in higher education. The information acquired through these ways will provide significant insights into the efficacy of the pedagogical framework and will inform future practices and breakthroughs in mobile learning tactics for higher education settings.

During the data collection procedure, thorough interviews, documentation, and observation are employed to guarantee that participants' responses are accurately represented. Thematic analysis will be performed on the data obtained from focus group discussions and interviews to find common themes, patterns, and repeating

concepts in the participants' perspectives on mobile learning in higher education. This study seeks to provide a full knowledge of the pedagogical framework of mobile learning and its impact on teaching and learning experiences by utilizing this qualitative technique with professors and students from the Educational Technology department at Universitas Negeri Malang. The qualitative data acquired will provide significant insights into future practices and improvements in mobile learning strategies adapted to the specific needs and context of mobile learning in higher education.

This research conduct Miles and Huberman's technique to analyze data obtained from focus group discussions and interviews with lecturers and students in the Educational Technology department at Universitas Negeri Malang in this qualitative study. To uncover patterns and themes linked to mobile learning in higher education, the method includes data reduction, data display, data comparison, and data interpretation [9]. The findings offer useful insights into the viewpoints and experiences of the participants, informing the pedagogical framework of mobile learning in this unique setting.

In this study, data triangulation is used to improve credibility and validity. It entails correlating findings on mobile learning in higher education using diverse data sources (focus group discussions and interviews) and viewpoints (lecturers and students). This approach ensures thorough insights and improves research findings, successfully informing the instructional framework.

3   Literature Review

3.1   Mobile Learning Overview

Many theories, such as learning theory and instructional design theory, may be applied when creating material for uploading to technology-based media. Following the steps for building e-learning materials using one of the instructional design models and ensuring that the resources are designed in a specified region, you can utilize the same strategies to design materials for mobile devices [10]. Mobile learning is the experience and opportunity provided by the evolution of educational technology [11]. Although there are differences of opinion about m - learning, [12] claims that mobile learning is the use of personal electronic devices to learn in a variety of scenarios through social and content exchanges. The term 'context' in this definition includes formal, self-directed, spontaneous learning, and context-aware, context-independent learning. Redefining teacher and student roles, blending the boundaries between official and casual learning, and leveraging the most recent developments in mobile technology are all components of mobile learning. To put it another way, education can be self-directed or guided by others, and it can even happen on the spur of the moment [13]. Both academic and non-academic settings can be used for learning. The learning process may or may not be impacted by the physical surroundings. Mobile learning is not just a traditional e-learning concept. The concept of mobile learning, which creates a customizable learning environment specifically for students, sets it apart from traditional forms of education.

Mobility in physical space: People who are on the move and who are trying to fill the gaps in their daily lives with learning, or who are using those gaps to reflect on what life has taught them. Location can be related to learning or just background. Technology Mobility: Portable Tools and resources are portable and conveniently packaged in one lightweight device. Cross-device transfers from laptops to mobile phones to notepads are also possible. Mobility in Conceptual Space: Acquiring knowledge about various topics that vie for an individual's attention. The typical adult works on eight major learning projects in a year and engages in numerous learning episodes each day, so that personal interest, curiosity, or engagement may lead to a particular conceptual topic. shifts attention from to another conceptual topic. Social Mobility: Learners move within different social groups, including family, office, or classroom encounters. Distributed Learning: Connecting and reinforcing various learning experiences from both formal and informal learning environments is an integral part of the cumulative process of learning. Mobile devices have the power to fundamentally alter both our expectations of what should take place in the classroom and how students learn. The advantage in previous research is the ability learn on the go, improve high order thinking skills, support alternative learning environments, enabled personalized learning and motivated students. Numerous advantages and chances to reach students in various ways, improve, and customize their learning are provided by mobile learning.

Creating content for mobile learning is not the same as creating content for e-learning. Numerous variables, including physical ones, could be the cause of this [14]. Mobile learning can be broken down into four approaches to define mobile learning: mobile devices, learners and learning processes, different learning and component combinations, and a combination of these three approaches [15].
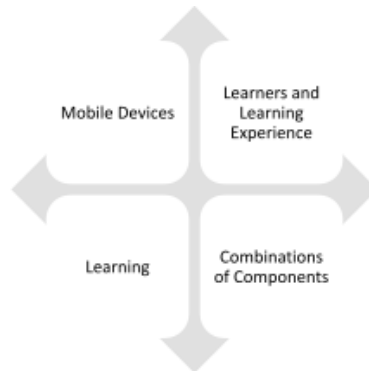

Fig. 1. Mobile Learning Approaches

The four methods depicted in Figure 1 [16] highlight the special qualities of mobile learning and set it apart from other types of training and education, including e-learning, online learning, and distance learning.

Mobile Devices

The use of mobile devices such as smart devices, laptops, and tablets in learning. The use of this as an intermediary device to store, deliver, enhance and support learning materials wirelessly and mobile.

Learning

where students can roam around physically and remain connected to information sources, educational materials, and data connection technologies. While many applications are made for educational purposes, there are currently very few that are made for adult learning.

Learners and Learning Experience

The perception of today's learners is drastically different: they are urged to take an active role in their education and to think critically. These changes in cultural and societal pedagogy include responses to behaviorism, linguistic pragmatism, the campaign for minority rights, the emergence of internationalism, and increased educational accessibility.

Combinations of Components

e-learning and mobile computing combined to offer access to learning-supporting apps at any time and from any location. Mobile tools for assistance: these technologies facilitate communication between educators and students by offering capabilities like file sharing, group chats, information searches, and more. Additionally, mobile devices can be used as teaching aids. Students use mobile devices, for instance, to complete their learning assignments.

3.2   Mobile Learning Framework

The educational aspect of mobile learning is finding ways to integrate mobile tools into teaching and learning activities. [6] Initially, activity is regarded as an analytical unit. Since multiple lessons are included in a course or program according to transactional distance theory. Second, communication technology, one kind of cultural-historical artifact in activity theory, mediates individual activity and socialization. Third, there is a difference between individual and group (or social) dualism, but it also needs to be balanced and related. Dimensions that show the range of individual activities to socialized activities can be a useful lens from which to review a wide range of mobile learning activities. Above all, the difference between individual activity and socialized activity is the generally understood and accepted categorization;
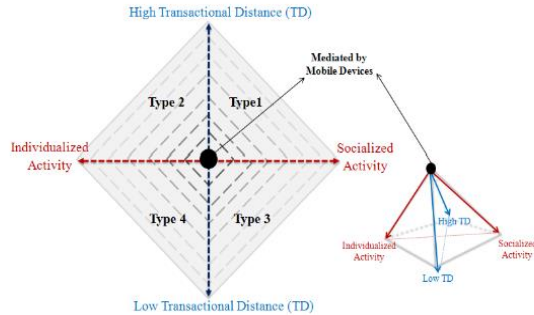
Fig. 2. Four Types of Mobile Learning Pedagogical Framework

  Figure 2, [17] there are four types of mobile learning pedagogical framework generated including (Type 1) m- learning high transactional distance socialized , (Type 2) individual m-learning high transactional distance , (Type 3) m-learning socialized with low transactional distance , and (Type 4) individual m- learning of low transactional distance.

   Type 1, This type of mobile learning activity occurs when 1) learners have more psychological space and communication with their instructors or institutional support; 2) learners participate in group learning or projects in which they communicate, negotiate, and collaborate with one another; 3) learning materials or activity rules are delivered from predetermined program via mobile devices; and 4) transactions occur primarily among learners and the instructor or teacher. This type of activity could replace typical technology-mediated classroom group activities in which students work in groups or pairs to complete assigned tasks or assignments.

   Type 2, When 1) individual learners have more psychological space and communication with instructors or instructional support; 2) individual learners receive well-structured and well-organized content and resources (e.g., lecture recordings, readings) via mobile devices; 3) individual learners receive content and control their learning process to master it; and 4) interaction occurs primarily between the individual learner and the content.

   Type 3, When using mobile devices, students interact with both professors and other students. They have 1) less psychological space and communication with the instructor; 2) loosely structured instructions; but (3) work in groups to solve a given problem and strive for a common goal; and (4) engage in frequent social interactions, negotiations, and communication in a natural way.

   Type 4, The final category of mobile learning refers to 1) less psychological space and communication between teacher and learner and 2) learning content that is loosely structured and indeterminate. Individual learners can interact directly with teachers on this basis, and teachers can guide and control learning in order to satisfy the requirements of individual learners while keeping their independence.

4   Results

The following findings are based on interviews, observations, and documentation of lecturers and undergraduate students at the educational technology Department at Universitas Negeri Malang. According to the findings of this study on mobile learning in higher education, students chose High Transactional Distance and Individualized Mobile Learning Activity. Students engaged more actively in mobile learning activities that allowed for greater autonomy and independence in their learning process, according to focus group discussions and interviews with lecturers and students in the Educational Technology department at Universitas Negeri Malang. Students liked the ability to adjust their learning experiences to their unique needs and preferences, as exemplified by the idea of High Transactional Distance, which is defined by a flexible and self-directed learning environment.
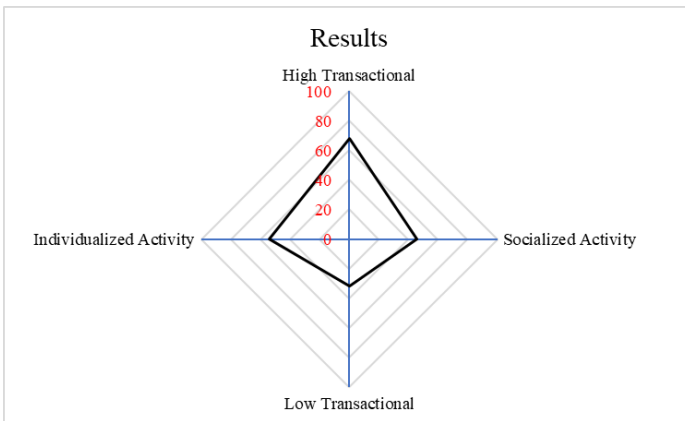

Fig. 3. Results According to Four Types Mobile Learning Pedagogical Framework

The data triangulation technique used in this study added to the credibility and validity of the findings by providing a comprehensive understanding of students' preferences for High Transactional Distance and Individualized Mobile Learning Activity in the context of mobile learning in higher education. These findings have important implications for the design and execution of effective mobile learning strategies that cater to students' preferences while also improving their overall learning experiences.

The results show two important elements of mobile learning that demand special attention: "High Transactional Distance" and "Individualized Activity." Each of the four categories that make up mobile learning—high transactional distance, low transactional distance, individualized activity, and socialized activity—has a unique set of characteristics [18]. In a mobile learning environment, high transactional distance refers to the extent of separation or remoteness between learners and instructors. Learners have more autonomy and independence in managing their learning activities in this context. They have the ability to explore resources and content at their own pace, with less direct assistance from teachers. As learners take

responsibility of their learning process, they may experience increased motivation and engagement.

Individualized Activity, on the other hand, emphasizes personalizing learning experiences to learners' unique needs, interests, and preferences. Learners can access personalized information and choose learning paths that match their interests and learning styles in the context of mobile learning [19]. The capacity to engage with educational resources that are relevant and meaningful to them improves the learning experience's effectiveness. Understanding the dynamics of High Transactional Distance and Individualized Activity is critical for building effective mobile learning experiences that adapt to the preferences of learners and encourage meaningful educational connections.

4.1   Design of Mobile learning

Enhancing in-context and inter-context dialogues is a critical task in the design of mobile learning technologies. This encompasses how technology, media, and interactions are structured to facilitate a continuous flow of learning across contexts, as well as how mobile technology is used in education to promote innovative practice. This includes comprehending how it is incorporated. Specific learning objectives should guide the design of mobile learning activities [20]. The usage of (mobile) technology is a means to facilitate otherwise impossible activities or to increase learners' interests [21]. As a result, the use of mobile technology may be acceptable just for certain tasks, while others may be better supported by other technologies or may not require technology at all.

The recommended characteristics for incorporating mobile learning into higher education learning into Type 2 : High Transactional Distance and Individualized Mobile Learning Activity environments are: (1) Mobile Context: Using mobile learning in a context where learners move (2) Exploration: Providing time to explore mobile technologies (3) Combination: Combining mobile and non-mobile technologies (4) Anytime: use mobile learning on the fly (5) Anywhere: use mobile learning in non-traditional learning environments (6) Anyone: use mobile learning individually and collectively (7) Affordability: mobile technology Take advantage of affordability (8) Personalization: Learners using their own mobile devices use (9) Mediation: Use mobile learning to mediate knowledge construction. (10) Production: Use mobile learning to produce and consume knowledge.
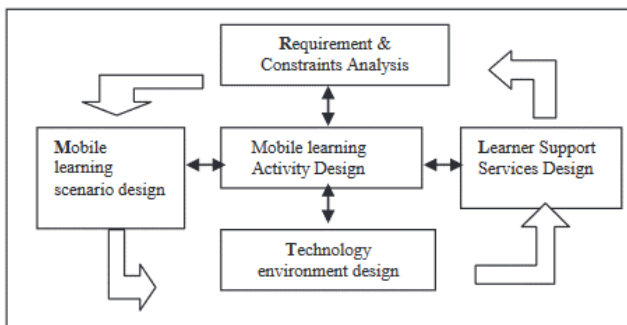
Fig. 4. Mobile Learning Design

Mobile technology environment learning also plays a role in the design of mobile activities learning. [22] Databases, platforms, networks, and other technological features of mobile learning are examples of "environments." We may need to obtain demographic data from people involved in learning situations due to typical mobile environment concerns. This is considered a user dimension. There are two types of user identities under the user dimension: user identities and student identities. As a result, information must be gathered from these two parties.

In terms of mobility, there is always the question of who or what is 'mobile' in the context of mobile education delivery. Is it a mobile learner, a mobile device, a content designer, or a producer of mobile content? The first subscription examines how students use mobile devices. Investigating student mobility entails investigating the roles that mobile users play as well as student profiles.

User pleasure and learning motivation are important considerations. Furthermore, the content must be nicely organized. Organized content can improve comprehension and so promote learning gain. Goals and objectives should be linked to organized content [23]. Goals and objectives, like other types of educational materials, provide direction. Summative evaluation, when performed after the deployment of new technology, provides a systematic approach to analyzing the effectiveness of the system and the learning that can be achieved. Mobile learning raises new issues for technology and learning assessment [24]. This paper addresses issues in mobile learning evaluation, describes novel tools and methods for collecting and analyzing mobile learning data, and proposes a mobile learning assessment framework.

The Mobile Learning Assessment Framework builds a general-purpose assessment plan for evaluating usability, educational effectiveness, and overall impact. Evaluation should be an ongoing process that begins at the beginning of a project and continues through design, implementation, and deployment [25]. More specifically, mobile learning assessments consists of three levels [26]. (1) At the micro level, we examine the individual activities of technology users to identify usability problems and determine how effective, efficient, and satisfying the user experience as in performing each activity supported by the technology. Evaluate what is high. (2) Intermediate level. Examine the learning experience as a whole to see how teaching and learning practices are changing in terms of breakthroughs, and how well the learning experience compares to other integrated learning experiences assess the educational value of new technologies. (3) At the macro level, assess the overall long-term impact of new technologies on established learning and teaching practices by examining the extent to which the introduced technologies meet initial aspirations, intentions and expectations.

5   Conclusion

The powerful invention that is mobile technology has the potential to both enhance and transform education in a variety of ways. For example, it can facilitate the

creation of instructional materials by teachers and open up new avenues for student engagement and collaboration. With the widespread reach of the Internet and IoT devices that can be connected everywhere, a new era of anytime anywhere education is dawning. Because mobile learning delivers high levels of engagement, novelty, customisation, and autonomy, it presents new opportunities for student involvement. For kids, having the option to continuously employ new apps and discover novel ways to utilize their gadget is invigorating and captivating.

Explore and discuss mobile learning pedagogical frameworks, tool integration, pedagogical approaches, assessment methods, and teacher training. Mobile learning approaches should be successful in the future. This challenge will force educators to rethink current teaching methods. Focus on making your materials accessible using the tools available today, not just looking for the next big thing in technology. Intensive research is needed to examine how appropriate technology and sound educational approaches can remove barriers to educational diversity.

The findings of this study with lecturers and students from Universitas Negeri Malang's Educational Technology department regarding High Transactional Distance and Individualized Activity in the context of mobile learning highlight the importance of learner autonomy and personalized experiences. The increased autonomy observed as a result of High Transactional Distance empowers these individuals to take ownership of their learning path, leading to higher motivation and engagement. Furthermore, the emphasis on Individualized Activity permits adapting learning experiences to fit the individual needs and preferences of these instructors and students, improving the learning process's effectiveness. Understanding and applying these factors into mobile learning design can result in more engaging and relevant educational interactions for lecturers and students, encouraging excellent learning outcomes in a variety of learning situations.

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