"MY STUDENTS": UNDERSTANDING FACULTY INFLUENCE AND EXPERIENCES IN USING MOBILE LEARNING PEDAGOGY

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ABSTRACT

Research on mobile learning pedagogy has been sporadic and often too narrowly focused. This present research aimed to understand faculty comprehension of mobile learning (ML) theory and how they may be using mobile learning teaching strategies. The research centered around a mobile learning pedagogy workshop designed to give faculty a practical framework for beginners to incorporate ML. Data were collected from a survey administered twice and several qualitative data sources. Quantitative data from the surveys were analyzed to determine any significant change in how the participants rated their mobile learning pedagogy awareness. Qualitative data were analyzed through an open coding process to determine themes across the workshop transcripts, open-ended survey questions, collaborative worksheets, and Padlet boards. The analysis determined that participants had prior experience with ML. Other themes that emerged were challenges of ML, influences on using ML, and the pedagogical function. These findings reinforce that the appropriate use of ML is student focused, relevant to the learning context, flexible, and adaptable.

INTRODUCTION

Higher education is at a confluence of the Digital Age, mobile learning, the maturity of online learning, postpandemic virtual schools, and a saturation of educational technology. The move to online and virtual classrooms during the height of the COVID pandemic made space for educational technologies and online learning practices to take root. It also dissolved the boundaries between in-person and online classes for many students. Many students have adapted to these changes and have relied on their mobile devices even more. As research in mobile learning (ML) has grown, research on faculty development for ML has stagnated. Previous research has established that students will use their mobile devices to support their education whether a course or instructor is ML focused or not (Galanek, et al. 2018; Leiberman, 2019; Nichter, 2021). Consider how much more effective teaching could be if it leverages the potentials of the technology students already use.

REVIEW OF THE LITERATURE

Mobile learning theory has continued to develop over the last decade, keeping pace with technological developments and changes in higher education. Yet research on mobile learning pedagogy (MLP) has not kept pace. Early theoretical research on MLP focused on molding established learning theories to emerging ML and centered on formal contexts, which rendered the research too narrowly focused to transfer to other learning contexts as technology and ML theory developed (Dennen & Hao, 2014; Motiwalla, 2007; Ozadamli, 2012; Park, 2011). However, MLP has received much attention and investigation in a few specific disciplines, such as medical and health sciences and language learning (Han, et al., 2020; Kukulska-Hulme et al., 2017).

As the theory of ML continued to develop and take shape, the focus began to shift to developing a companion pedagogical theory or framework to fit broader contexts. Cochran (2013) insisted that mobile learning development should be a catalyst for pedagogical change. His analysis moved beyond a specific learning theory application and focused on the current technological landscape of the time. Additionally, Kearney et al. (2012) developed a framework for mobile learning pedagogy that was broad enough to transfer to different educational contexts yet still focused on the unique characteristics of mobile learning. Authentic context, personalization of learning, and collaboration emerged as core concepts of their pedagogical framework (Kearney et al., 2012).

Since 2013 research on MLP has stalled. Perhaps the difficulty in coming to a universal definition of ML (Grant, 2019) has affected its impact on more areas of higher education pedagogy. Bikanga Ada (2018) also noted the lack of a "cohesive and unified mobile learning framework" (para.1) as an obstacle to furthering research pedagogy development. For example, Daughtery and Berg (2017) noted the lack of research on mobile learning pedagogy as their review also highlighted that the available frameworks at the time were still narrowly learning theory focused. Still, in 2022, Tlili et al. noted the limited research on mobile learning pedagogy. In their review of 165 empirical articles, the majority were still focused on formal learning contexts, though game-based learning and collaborative learning have seen growth in the research (Tlili et al., 2022).

This research aimed to understand the faculty's current understanding of ML theory and incorporating ML strategies into their teaching practices. The research focused on a mobile learning pedagogy workshop I designed to give faculty a practical framework for beginners to incorporate ML on a manageable scale or build on current ML teaching practices.

STUDY DESIGN

This mixed methods research was designed around the mobile learning pedagogy workshop, which was offered four times across the 2021-2022 academic year. The workshop was first offered in a simultaneous in-person and online format. However, the overwhelming majority of workshop attendees choose the online option. Three of the workshop offerings were delivered via Teams video conferencing, and the fourth took place at a national virtual conference.

The research design utilized a combination of quantitative survey questions, open-ended survey questions, observations, and artifact analysis. The primary questions to guide this research were:

1. What mobile learning teaching techniques are faculty currently using?
2. What is influencing faculty to add mobile learning to their pedagogy?

Research Setting

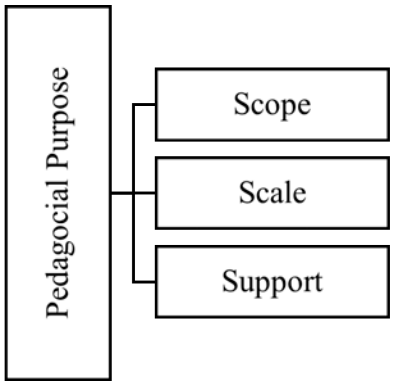
The workshop's purpose was to facilitate faculty in understanding ML theory to develop a mobile learning pedagogy. Since a shared definition of ML was foundational, the workshop began with a brief analysis of the definition provided below, a discussion of the epistemological foundations of ML, and a discussion of common myths about ML. The workshop objectives were to demonstrate how ML is adaptable across subject matter and course type and to equip faculty to incorporate ML into their teaching strategies at a comfortable level.

Mobile learning was defined as situationally based on the mobility of learners and learning contexts, allowing for fluidity of personal learning in time, content, and context, and mediated through technology (El-Hussein & Cronje, 2010; Sharples et al., 2016).

The second section of the workshop encouraged participants to consider what applications or technologies would facilitate ML in their classrooms. Considerations of technologies, possible assignments, and course policies were viewed through the Pedagogical Purpose, Scope, Scale, and Support framework (see Figure 1). This framework was developed from the literature (Bikanga Ada, 2018; Parsons et al., 2016; Zheng et al., 2018), which identified these as important stepping stones for teachers to create a mobile learning pedagogy. Pedagogical Purpose is the primary hierarchical level of the framework since the teaching purpose should shape how a unit or assignment is designed and other choices that are made concerning the technology. Scale is the extent to which the technology or application would be used in the course—timeliness, pedagogical boundaries,

and technical capabilities. Scope is the use within the course and if the technology use can build on itself, such as building students' technical skills or scaffolding lessons aided by technology. Support encompassed the technology support concerns that faculty would need to consider for themselves or their students. Additionally, in the second section, workshop participants used a collaborative worksheet to record and share ideas about designing an assignment or learning unit with ML in mind. Participants also used Padlet, a popular brainstorming site, to share ideas and experiences with ML.

Figure 1. Mobile Learning Pedagogy Workshop Framework



Participants

Three of the four workshop offerings occurred at one medium-sized university during the Fall and Spring semesters of the 2021-2022 academic year, and the fourth occurred at a national online conference in the Fall of 2021. Participants (n = 45) were primarily faculty, though two were instructional designers (see Table 1). To provide anonymity, participants' names were not collected on the survey responses, and specific names were changed to 'Participant Letter' for comments from the workshops and the chat transcripts.

The majority of participants had experience with the three types of course delivery: in person, online, and hybrid (Table 1). Approximately half the participants were midcareer with 11–20 years of experience, though 22% of participants were at the beginning of their teaching careers (Table 2). Additionally, participants' teaching subjects showed variety across many academic disciplines (Table 3). It is important to note here that participation in the workshops and the research were voluntary, noting an openness to ML.

Table 1. Course Level and Delivery Type

Level	Frequency	Percent
Instructional Designer	2	4.4
Both	9	20.0
Graduate	10	22.2
Undergraduate	24	53.3
Total	45	100.0
Type	**Frequency**	**Percent**
In-person	3	6.7
Hybrid	5	11.1
Online	15	33.3
In-person; Online; Hybrid	18	40.0
In-person; Hybrid	2	4.4
In-person; Online	2	4.4
Total	45	100.0

Table 2. Years of Experience

Frequency		Percent
1-4	10	22.2
5-10	1	2.2
11-15	12	26.7
16-20	15	33.3
20+	7	15.6
Total	45	100.0

Table 3. Teaching Subjects

	Frequency	Percent
Applied Sciences	1	2.2
Business	4	8.9
Communications	3	6.7
Education	3	6.7
English and Foreign Language	2	4.4
Health and Wellness	12	26.7
History	2	4.4
Instructional Designer	2	4.4
Information Technology	6	13.3
Leadership	3	6.7
Natural Sciences	5	11.1
Social and behavioral Sciences	1	2.2
The Arts	1	2.2
Total	45	100.0

SOURCES OF DATA AND ANALYSIS

This study had three primary data sources: preworkshop survey and postworkshop survey, participant observation, and workshop artifacts. At the start of the workshop, participants completed a brief survey gathering demographic data and measuring their awareness and perceived use of ML. Four to six weeks after the workshop, participants were asked to complete the survey again, and changes in their responses were analyzed. Participants' comments and contributions were observed and recorded during the workshop for textual coding. During the workshop, participants also created two artifacts used for textual coding—the collaborative worksheet and Padlet board.

DATA ANALYSIS

Quantitative

Three items from the survey were analyzed to measure any change in the participants' reported awareness of ML, MLP, and their overall level of awareness of MLP. CrossTab analysis analyzed any significant change in the survey responses before the workshop (Time 1) and the responses 4–6 weeks after the workshop (Time 2). Participants were asked to rate their level of awareness of mobile learning pedagogy by these three levels:

Basic: I know a little bit about the topic

Moderate: I know enough about the topic to affect my teaching practices

Advanced: I know more about the topic and actively use mobile learning pedagogy in my teaching practices

Qualitative

Textual data from the workshop discussion transcripts, workshop chat transcripts, the two open-ended survey questions, the collaborative documents, and the Padlets were analyzed through an iterative inductive open coding process. Following Ravitch and Carl's (2016) principles of inductive and open coding, the textual data were analyzed through iterative processes. Through the first analysis, broad categories were identified among the textual data through comparison and rereading. Then coding was refined through repetitions of the reflection and review coding process for themes. Extensive coding memos were kept to chronicle the themes and subthemes as they developed.

FINDINGS

Quantitative Results

A Chi-Squared CrossTab analysis was performed using SPSS 27 to determine any significant change in participants' self-rated report of their awareness. Participants were asked at the start of the workshop, Time 1, to rate their awareness of mobile learning pedagogy and again 4-6 weeks after the workshop, Time 2. Time 1 and 2 served as the independent variable, and the three levels of awareness—basic, moderate, and advanced—were the dependent variables. Table 4 shows the participant's mobile learning pedagogy awareness rates from Time 1 and 2. However, no significant difference was found between the groups. Far fewer participants completed the survey the second time, which may explain the lack of variance. Yet, the themes from the qualitative analysis may shed more light on why participants were less likely to change their self-reported awareness.

Table 4. Mobile Learning Pedagogy Awareness Reported by Participants

		Level of Awareness			
		Basic	Moderate	Advanced	Total
Time 1 or 2	1	16	14	2	32
	2	5	5	2	12
Total		21	19	4	44

Qualitative Results

The first coding phase began with the collaborative worksheets and contributions to the Padlet boards with side-by-side comparisons. Two broad codes apparent across these documents were *prior experience* and *pedagogical function*. All the participants had some prior experience with ML, though a few did not seem to realize it at the start of the workshop. One participant's comment on the survey encapsulates this perception, "If I used any mobile learning strategies, it was merely happenstance not intentional."

The following coding phase focused on the open-ended questions from the survey responses. Two broad codes apparent in this phase were *specific programs* and *pedagogical purpose*. Evidence of how some participants were thinking about pedagogical purpose was represented by Participant E's comment in the chat, "I try to make sure I'm using programs that [students] will use in the workplace

if possible," and another participant's answer on the survey, "Better reaching my students, facilitating the learning process for students."

The third coding phase analyzed the conversations during each of the workshops and the chat transcripts. Commonalities began to emerge at this stage with the codes already identified, and a fifth code broadly identified as *problems* was prominent. Examples of *problems* that participants voiced were bandwidth, technology access, digital divide, having to troubleshoot, student behavior or use, and being overwhelmed. After mentions of several of these problems in one chat, Participant L wrote, "I am almost to the point of buying one of everything, so I can help the students troubleshoot with some of my software."

Specific themes and subthemes began to rise to the surface through further analysis of the broad codes identified. Each of the themes is identified here and further explained below. The first theme, *prior experience*, was prevalent across all types of data and shed light on the context of the other themes. The code *problems* was refined as the theme *challenges* to incorporate the rich variety of concerns, problems, and challenges expressed by the participants. The last two themes resulted from the survey's open-ended questions and incorporated data from all the other sources of data: *influences* and *pedagogical function and application*.

Prior Experience

Entries on the collaborative worksheet KWL chart provided a detailed description of the variety of prior experiences with ML. In the "Know" column, participants noted using the Google Suite of apps, Adobe Rush, Adobe Spark, and Canva. Some entries were more general and identified a pedagogical purpose as well, such as collaboration, students creating content, and presentation skills with videos and podcasting.

The first open-ended question on the survey asked participants to provide examples of "mobile learning pedagogy strategies used in the last 4-6 weeks." One the initial survey completion, more participants skipped this question or answered "none" or "NA" than answered it. However, those who answered provided rich examples of programs or teaching strategies used. Some programs mentioned were Nearpod, Flipgrid, Kahoot, Jamboard, and Hypothesis (see the Appendix for a complete list of programs mentioned across all qualitative data sources). Teaching strategies that were named include video conferencing, chunking information, preparing assignments to be "mobile friendly," and recording lectures.

Challenges

Almost any discussion of technology will bring up expressions of challenges with that technology, and that phenomenon was also present in this setting. Comments during the workshop expressed concerns about ML being "too much" or beyond their control and other feelings of "overwhelming" technology, both in the options available and its perceived complexity. This theme was the most wide-ranging, so the data was deduced into five subthemes to better understand the participants' experiences and perceptions.

Technology Problems. The comments that specifically expressed technology problems concerned the shortcomings and failures of some technologies. Several participants specifically noted shortcomings with the learning management system used across the entire campus. They expressed that bandwidth was a challenge to implementing ML since it can vary by location, and students might not have Wi-Fi access beyond campus. Participants also expressed concerns about having to help students troubleshoot problems. These concerns ranged from being their tech support to guiding students to tech support. Participant A explained that creating an instructional video to teach students how to use the podcasting app for the assignment. Whereas Participant C noted that learning management system problems were "beyond my means to troubleshoot and [students] aren't used to contacting IT helpdesks yet."

Student Behavior and Use. Students' lack of efficacy when contacting technical support and their possible lack of access to mobile technologies or reliable bandwidth brought to light challenges specific to the student experience and use. Participants noted problematic student behaviors with mobile technology, such as joining a live virtual class session while driving, sending messages and expecting a response at "any hour of the day," and academic integrity concerns. Participant C noted:

I guess another aspect is the issue of professionalism and boundaries in setting with tech available 24/7. I've had students book virtual office

hours meetings with me, but then join on their phone while walking through [town]. Not ideal for me to interact with them.

Participant E observed that "just because [students] have technology does not mean they know how to utilize the potential in the technology."

Access. Comments about bandwidth and "those who do not have the resources" highlight these concerns about access. From the survey, participants noted "accessibility and ease of use," "student need and ease of use," and "accessibility and student motivation" as an influence on their use of ML teaching strategies. Participant D summarized the heart of this concern with the provocative question: "What is the fate of those who do not have the resources, social support, or face any roadblock to utilize the underlying technology?"

Burnout. A few participants noted feeling burnt out or feeling overwhelmed in the chat during three of the workshops, and many participants responded to those comments with agreement. The comments in this category were equally about faculty burnout and student burnout. Participants noted: "I am on tech burn-out mode," "the amount of options is almost overwhelming," "sometimes students resist making new accounts for every different tool," and "I have experienced students burnout overtime with apps like Kahoot when every professor is using it in every class."

Reluctance. A variety of comments across the different data groups hinted at an undertone of skepticism coupled with an acceptance of the current educational context. While faculty noted that digital and mobile are integral to this educational landscape, the tone did not seem excited but instead accepting. The term reluctance seems to encapsulate these comments the best: "recognition of changing communication patterns," "students are always on their phones and some won't use a computer or laptop," "moving from a traditional to mostly online teaching mode," and "I have a sinking feeling that this is the direction our university is going."

Influences

The second open-ended question on the survey asked participants: "What influences your choice to incorporate mobile learning pedagogy into your teaching practices?" This theme also appeared on the chat transcripts. Participants responses were richly detailed and had meaningful repetition that revealed the mindset and focus of the participants, such as "my," "students," "efficiency," "effective(ness)," "accessibility/access," "engagement," and "motivation." The predominance of "my" and "students" indicated the first two influences, student focus and professional focus, and the rest of the comments fit the influence of context.

Student Focus. The student focus was one of the most prominent influences on a teacher's choice to use ML teaching techniques. A sampling of comments that indicated a focus on students as a primary influence on using mobile learning pedagogy are as follows:

"helping students learn in the best way"

"This is how we can engage more students"

"I am very interested in improving the learning experience of my students"

"Student need and ease of use"

"easy navigation for students, and accessibility of the device"

"It helps the student, it builds connectivity, it reinforces learning, it supports the student"

"another method provided for students learning experience"

"Better reaching my students, facilitating the learning process for students"

Professional Focus. Comments that fit in the professional focus as an influence indicated a desire to improve ones' teaching practice or related to the respondents' profession and experiences, such as:

"Being a more effective online faculty member"

"Ease of incorporation into lessons"

(appropriate) "use in my classes"

"to improve my teaching"

"Efficiency and effectiveness of use in my particular classroom"

"Help my students learn and enjoy my classes"

"on time learning"

"My ability to monitor the student responses"

"visuals make a big difference in how things are perceived"

Context. Responses that fit *context,* as in influence, showed consideration of the educational context in the abstract and concrete sense. For example, abstract context comments were "abundance of technology," "21st century learning requires it," and "moving from a traditional to mostly online teaching mode." Some concrete context responses were references to "my class," "Students are always on their phones," "the

technology my student has [access to],” and “student need and ease of use.”

Within the *context* category was an undertone of change. Several participants noted change as a motivating factor for incorporating mobile pedagogy in their teaching methods. The prevalence of online learning through all types of course delivery was noted in a few responses: “recognition of the changing communication patterns of our students,” “moving from a traditional to mostly online teaching mode,” and “I have a sinking feeling that this the direction our university is going.”

Pedagogical Function and Application

This theme quickly rose to the surface during the workshops, in the chat transcripts, from participants’ brainstorming on Padlet, and on the collaborative worksheet. Phrases such as “evidenced based way,” “being intentional and purposeful versus jumping on the bandwagon,” and “effective and evidenced-based” reveal participants’ focus on meaningful implementation. Several comments also reinforced the *context* subtheme from the *influences* theme. Participants mentioned context or discipline-specific programs such as Timeliney, TimeGraphics, Seterra, Vernier Graphical Analysis, and PhET modules.

How To. Entries on the Want to Know column of the KWL chart had a concentration of “how to” comments, such as “how to get started” and “how to start small.” Other comments in this subtheme were:

“how to engage student[s] in new [methods] of ML they are not used to”

“how to use other software specifically for mobile phones (apps), and how to incorporate it into my teaching.”

(implied how to) “fastest way to communicate with students that isn’t texting”

Survey responses provided a rich description of the *pedagogical function and application* theme. Some comments focused on specific concerns, such as measuring the effectiveness of ML and documenting student engagement. Blackboard Ally was explicitly mentioned in some of the follow-up survey responses, showing a desire to improve inclusiveness and adaptability. Survey responses from the follow-up surveys were much more detailed:

“use a graphing app to present data; OER, PheT modules; PPt that are downloadable and editable and Ally friendly.”

“virtual scavenger hunt, constant or instant feedback, tailored experience with individual meetings, scenario-based learning, personalization.”

“converted files to editable .docx and did away with PDF as much as possible; provided short videos and 100% Ally scored transcripts, did an infographic assignment.”

Participant B’s chat comment highlights the importance of considering the pedagogical function of the ML strategies to employ: “We use interactive anatomy web and app based options, and a student version of a web-based electronic medical record system to replicate clinical practice.” And Participant E’s comment about what learning theories may apply to mobile learning pedagogy, “it depends on the discipline I think,” is apt.

DISCUSSION AND CONCLUSION

That all the participants had prior experience with ML was not surprising since participation in the workshops was voluntary and likely spurred by personal interest and experience. While that prior experience varied across participants, it was clear that workshop participants were motivated to improve their teaching or improve their students’ learning experience with mobile learning. For the first two offerings of the workshop, in the Fall of 2021, access may have been at the forefront of participants’ minds since that was the first semester returning to fully in-seat classes after being remote and virtual for most of the previous academic year. The virtual class experience brought into stark reality the limited access to reliable internet connections for many students and how that can negatively impact student engagement and motivation.

Influences identified by faculty to use ML teaching strategies showed that participants overall embraced ML, which may have been a characteristic of the group, but this can highlight motivations for less enthusiastic faculty to consider ML. The abundance of specific programs and pedagogical functions mentioned supports previous research that context and relevance are important elements of effective use of technology for education (Bikanga Ada, 2018; Daughtery & Berg, 2017; Parson et al., 2016). These characteristics from the data are congruent with what Kearney et al. (2012) identify as authenticity.

The subtheme of *change* also highlights that

the same change can be both comfortable and uncomfortable for faculty. The change noted by the respondents is possibly an effect of the pandemic context of learning. The workshops were delivered in the first semesters of the academic year when many campuses returned to in-person course delivery, which was the case for three of the four workshop groups of participants. As colleges are returning to postpandemic operations, many of them are still keeping qualities of the virtual or online formats they used at the height of the pandemic (such as paperless in-person courses and relying more on technology and the learning management system for course delivery).

Continual research is needed to document the current uses and approaches to mobile learning pedagogy to work toward a more applicable framework. More research is also needed on mobile learning pedagogy across all disciplines in higher education. Additionally, since technology development continues to affect educational technology use and because of changes forced by the COVID pandemic, building better support systems for faculty using mobile learning is needed. A characteristic of such support could be workshop settings where faculty can share their experiences and learn from peers within and across their disciplines.

Thus, focusing less on learning theory adoption and formal learning environments and more on discipline-specific contexts and student-centered strategies seems to be the catalyst for enabling faculty to design the appropriate adoption of mobile learning pedagogy. This may be the most appropriate approach since the core nature of mobile learning is flexibility, fluidity, and adaptability.

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APPENDIX

Learning Apps/Sites Named by Participants Organized by Primary Educational Use

Content Delivery	Student Work	Communication	Assessment
Youtube	FlipGrid	FlipGrid	FlipGrid
Edpuzzle	Canva	Kaltura	Edpuzzle
Kaltura	Adobe Spark	H5P	Kaltura
Adobe Spark	Mentimeter	Whatsapp	Mentimeter
Mentimeter	Jamboard	Remind	Padlet
H5P	Padlet	Slack	Jamboard
Vernier Graphical Analysis	H5P	Teams	H5P
Miro	Vernier Graphical Analysis	Zoom	Vernier Graphical Analysis
Quizlet	Miro	Blackboard Collaborate	Poll Everywhere
*Quizizz	Quizlet	Microsoft 365	Slido
*Kahoot	*Quizizz	Google Suite	Quizlet
*Seterra.com	*Kahoot		*Quizizz
Screen-cast-o-matic	Time Graphics		*Kahoot
Time Graphics	Timeliney		*Seterra.com
Timeliney	Google Forms		Perusall.com
Perusall.com	PowerPoint		Hypothes.is
Hypothes.is	Adobe Rush		*NearPod
TED Talks	Rocket Book Beacons		PheT simulations
Google Suite	Audacity		
*NearPod	Microsoft 365		
PowerPoint	Google Suite		
PheT simulations			
OER			
Adobe Rush			
Rocket Book Beacons			
Audacity			
Microsoft 365			

*indicates a game-based program or app