

Exploring the Potentials and Essentials of Mobile-Aided Pedagogy in Teacher Education

Reynald M. Cacho

Philippine Normal University, South Luzon
cacho.rm@pnu.edu.ph

Abstract Mobile learning has found a niche in higher education setting where smartphones are increasingly penetrating campuses. This paper reports on the investigation of the influential factors for promoting the use of smartphone in teacher preparation programs in the higher education context. The essential factors for promoting the use of smartphone in teacher preparation programs in a small Philippine university are commonly overlooked or at times understudied. A qualitative interview of purposefully selected nine preservice teachers in a small teacher education institution was conducted. Interview responses treated qualitatively confirmed that the students' academic uses of smartphone and support of their university subject teachers are the practical benefits and enabling condition in smartphone-aided learning, respectively, alongside its share of disruptive tendencies and challenges. Perspectives about mobile-aided pedagogy and future study directions are then succinctly forwarded.

Keywords: Mobile learning, preservice teacher education, smartphone apps, teacher education

Introduction

Mobile devices are ubiquitously present in education institutions local and abroad. For innovative educators, not considering the use of technology in higher education setting is no longer a choice. Rather, it is becoming a new normal paradigm shift in teacher education. Scholars, however, caution the use of mobile technology in learning and teaching because it is not the ultimate solution in making education relevant and responsive. Yet, it can be a power tool if used in a pedagogically sound process. In particular, mobile learning is not just the use of handheld device per se; “it implies adapting and building upon the latest advances in mobile technology, redefining the responsibilities of teachers and students, and blurring the lines between formal and informal learning facilitating understanding of what it means to be a lifelong learner” (McQuiggan, Kosturko, McQuiggan, & Sabourin, 2015 p.8).

Since smartphone ownership is high and continually skyrocketing in both developed and developing countries, would integration of such mobile device in the higher education setting be a common scenario? A recent survey within two countries in the Gulf Region revealed that 99% of the university students owned, in particular, smartphones; these students were very much positive towards the use of M-learning (mobile learning) in their courses (Al-Emran & Shaalan, 2015). Elsewhere in Korea, university students in the regular program embraced mobile learning based on its perceived usefulness whereas students enrolled in an online mode were used to the mobile learning environment (Shin & Kang, 2015). Thus, smartphone integration in the higher education, whether formal and informal, is not new. Interestingly, the way it is specifically integrated in authentic and control setting has baffled so many researchers around the globe, and so as the interest and concern this paper would like to look into.

Literature Review

Collaborative interaction among students and professors in using smartphone for learning is seen as a better alternative rather than increasing the divide of mobile use and access between learners and teachers. In a similar manner, selected mobile functions, experiences, and mobile learning strategy in a university setting were identified and proposed (Alden, 2012). Adoption is not limited to smartphone; nonetheless, it included availability of compatible format of courseware for laptops and desktops. Lesson learned also covers essential implementation strategy that was made possible by effective instructors and students interaction. Hence, creating an interactive, collaborative and ubiquitous environment is one way of taking advantage of the affordances mobile device has to offer (Chen, 2013).

Mobile devices such as smartphones and tablets have been considered as useful tools, for they offer various direct and indirect academic benefits. Sense of accomplishment emerged in student academic tasks completed and games won; at the same time, competence increases in being able to do specific academic tasks using one's ICT knowledge and skills (Park & Han, 2013). Aside from its communication, socialization, entertainment, and access to information functions, students utilize smartphones for learning and regarded it to be very helpful in their scholastic work (Dukic, Chiu, & Lo, 2015). In addition, the use of mobile device in learning also enhances higher order thinking skills. In an experimental study conducted in a Taiwan university, treatment group following a problem-based learning strategy tended to be more engaged in reflective thinking, sharing more information, and further facilitating social knowledge construction among course members using smartphone (Lan, Tsai, Yang, & Hung, 2012).

Despite the promising gains and widening penetration of mobile technologies, the primary social agents—the instructors/teachers in the university, still hold the key on how such potentials could be converted into measurable outcomes (Aubusson, Schuck, & Burden, 2009). Unfortunately, a considerable number of teachers were not willing to take advantage of the mobile technology inside and outside the classroom (Agbatogun, 2013; Dashtestani, 2015). Although there are students who would desire particular digital teaching and learning formats aided by smartphones, they are not equitably provided or encouraged in class (Zawacki-Richter, et al. 2015). Interestingly, students and teachers who were very much comfortable with mobile technologies would more likely use smartphone for learning availing themselves such benefits (Mac Callum, Jeffrey, & Kinshuk, 2014). On the other hand, other social factors in the use of smartphone for learning could be students’ peers or relatives and other external forces that could be looked into in depth.

Baran (2014) argued that the literature “lacks new approaches, models, and frameworks” where “systematic and programmatic efforts are missing that explore the integration of mobile learning into preservice teacher education curricula” (p. 23). Viewed positively, teacher educators and researchers could explore the pedagogical affordances of new mobile technologies in university contexts (Muyinda, 2007); hence, there exists a need for research on mobile learning in terms of educational practices as well as pre-service teachers’ mobile experiences was needed. Moreover, the call to consider learners’ experiences with mobile technologies in education and how mobile learning can be used to make unique contributions to the advancement of higher education and learning is ever pressing (El-Hussein & Cronje, 2010; Traxler, 2007).

Purpose of the Research

Thus, this study aimed to explore the essentials of integrating smartphones in student teachers' academic works in teacher education.

Methodology

This paper reports part of the findings of a collective mixed methods study on the essentials and nuances of mobile-aided course delivery and enhancement in a small teacher education institution in the Philippines. The focus of this paper revolved on the results of the qualitative interviews. The researcher purposefully hand-picked the interview participants based on two criteria: (1) varying length of mobile ownership from beginner to experienced; and (2) year level representation consisting first year to graduating student teachers. Then, the researcher clustered the participants according to three categories depending on the length of smartphone ownership in terms of months: beginner (0 to 11 months), intermediate (12 to 23 months), and experienced (24 and up months). In each group, the researcher purposefully identified three participants with consideration of their willingness to take part and on the guidelines by Suri (2011) in confirming and disconfirming cases in order to validate a specific group of participants and/or data.

The toolkit and procedures for the interview were adopted and revised from the instruments of Lee (2014) and Vázquez-Cano (2014). The interview guide consisted of eight questions (see Appendix A). Nine student teachers were individually interviewed about their views and experiences on the use of smartphone in academic courses. The average interview time was 25 minutes. All interviews were voice-recorded and transcribed. The data coding and analysis was aided by NVivo 11 (a qualitative data analysis software).

Nine participants (5 males and 4 females) who were grouped according to length of ownership of smartphone in months were as follows: the beginner (3, 7, 9; F=3), the intermediate (15, 16, 20; M=3), and the experienced (25, 28, 48; M=2, F=1). The first group ages in years consisted of 16, 17, 18; the second, 18, 19, 20; and the third, 20, 21, 24. Seven of them were under the elementary education program while the remaining two were in the secondary education major in English. The student teachers' smartphones were in android-based platform—mostly Samsung (6), Lenovo (1), Sony (1), and the Philippine local smartphone brand, Cherry Mobile (1).

All transcripts of the interviews were coded after taking into consideration the guidelines by Creswell (2014) and Taylor, Bogdan, and DeVault (2016). Nine codes were assigned to the information cases in the nine transcripts. These codes were then aggregated into five focused themes. Two validation strategies were applied in the data analysis. First, the quantification (frequency counts of key words related to themes and coding of the content words using NVivo version 11) as a way to coherently validate the themes. Second, follow-up debriefing or member checking (Creswell, 2014) was conducted to present the findings or generated themes of the qualitative interview to the participants for accuracy or confirmation of results.

Results

Looking into the qualitative data, the researcher drew five key themes on nine cases: 1) views on smartphone usefulness (focused on the device as a tool or applications for varied purposes); 2) academic functionalities (student related experiences using smartphone); 3) instructors' influence (teacher trainers led or facilitated smartphone-aided activities in the classroom); 4) peer influence (role of

friends, classmates, or relatives on smartphone choice and use); and 5) challenges (difficulties or setback to optimize the use of smartphone for learning). The qualitative results manifested how the participants view the affordances of smartphone to improve learning in a well-thought teaching and collaborative environment amidst some challenges that surfaced or could emerge.

At the onset, all the participants appeared to be knowledgeable in using their respective smartphones. If ever they would encounter difficulties on the use of their device, they would find ways such as: ‘consult the internet, watch some Gadget Guru fixing videos and ask my relative’ and ‘self-discovery or exploration.’ Similarly, they did only comment on its usefulness as a device for communication, but they also noted its benefits related to file sharing, entertainment use, internet connection capability, storage capacity, and portability. Apart from being intuitive in using smartphone, most participants realized that its usefulness cannot be optimized if one does not know how to use them properly and efficiently.

A second theme revolved on smartphone academic functionalities where students relate such usefulness in their academic course activities. The interviewees drew out varied experiences where they used their mobile phone to comply with course activities inside and outside the classroom or while ‘on the go’. Given an enabling environment, some narrated that inside the classroom they were able to answer the instructor’s questions on specific concept using their smartphone through a simple internet surfing while others cited that with the use of smartphone off-campus, they were able to take online quiz and connect with their classmates via Facebook group chat through ‘messenger’ to discuss class work or projects. In addition, most of them noted that they had functional apps such as ‘Facebook, Google, Merrian Webster dictionary, Shareit, pdf viewer, word document productivity

tool,' to name a few, that were very useful in academic work. On the other hand, views, preference, and experiences on the use of smartphone functionalities for learning seemed to vary depending on the length of ownership or use (see parallel display of length of ownership and key responses in Table 1).

The third and fourth themes underscored social influences to student teachers' use of mobile phones. Such influences seemed to be exerted by their teachers and friends or classmates. Interview participants acknowledged the important roles teacher trainers play in the delivery of their (instructors) courses aided or accessible through smartphone. In general, students regarded the role of their instructors as 'facilitators', 'source of information', 'helpers', or 'integrators' of different mobile technologies in their respective classrooms. Hence, some of their teacher educators introduced and/or encouraged the use of 'Google apps', 'dictionary tool', and 'Facebook group' through their mobile device. They admitted, however, that not all their instructors allowed the use of smartphone in their classes. The students perceived that some teacher mentors were worried about the distractive tendencies smartphone could wield in class time activities.

Students or teacher trainees seemed to be influenced also by their co-learners or classmates but not on the academic usefulness of the smartphone but rather more on a different social purpose. One interview participant recognized the influence pressed upon them by their classmates particularly in owning a mobile phone when he/she disclosed that '...if you have a smart phone, you are not left behind... because nowadays if you have a smart phone you're in.' Moreover, some participants noted the advantage of sharing useful apps. In transferring pdf reading materials and apps, they would normally run 'Shareit' (sharing mobile app) which they were able to install in their phones because of some

friends' recommendation. What were shared, however, were mostly leisure and/or games apps (like clash of clans, paino tile, cooking fever) which were openly shared and played with friends or individually offline. Notably, some indirect influences were facilitated online through social networking sites (SNS). Participants who were very much active online mentioned they 'could not avoid leisure in different social media.' Such circumstances mentioned here justified that the academic use of smartphone was much more influenced by teachers and less to none by their peers. However, peer influence on the use of smartphone for other non-academic purposes could not be totally discounted albeit it would benefit to conduct a deeper investigation about the nature of influences co-learners exert on each other in a 'community of practice model for developing countries' as promoted by Brown (2005).

The last and the fifth theme centered on the challenges in the use of smartphone to aid learning in academic courses. When student teachers talked about the issues or problems they encountered for the use of this mobile device, they all noted that a dedicated internet connection matters. Without internet connection one could not research or access the flexible online classes held in support of the regular face-to-face meetings. Moreover, one beginner user was indeed a beginner for hardly identifying which site can be trusted or not. Apart from the connectivity issue, there were hardware limitations that surfaced which included: not enough memory space for apps, fast draining battery, and having small screen. What seemed to be a more pressing issue was not just on the connectivity and hardware specifications but more on user addictive experience with the device. Most of them acknowledged that they had addictive games and social networking site connection in their phones via mobile data connection (which often was freely provided by their network). At one point, one noted that 'rather than

reading previous lessons, I bond with my phone by playing some games and surfing the net.’ On the positive light, all the participants recognized the fact that between more than harm or good, the efficient, strategic, and responsible use of smartphone for learning would mean more gains than losses in this mobile-connected environment.

Table 1. Parrallel Display of Length of Ownership and Key Responses

Ownership (in months)	Smartphone Usefulness	Academic Functionalities	Instructor	Peer	Challenges
Beginner (3, 7, 9)	‘...so many benefits using it properly.’ ‘handy e-library where they can get there e-book anytime.’	‘It’s easy to review our topics like PowerPoints, documents, web pages...’ ‘...in terms of studying, I improved...’	‘They are the facilitators in using the smartphones.’	‘... if you have a smart phone, you are not left behind... because nowadays if you have a smart phone you’re in...’ ‘It improves my awareness in different happenings in the society.’	‘...I could research conveniently but still don’t trust the internet too much.’ ‘when it is addictive and fun to play even if there is class.’
Intermediate (15, 16, 20)	‘I can share files with others, I am also updated in every announcement.’ ‘use it everywhere unlike computer...’ ‘I can upload and download files from the internet without using computers... have fun by using educational games apps.’ ‘Smartphone is one of your best tools today for learning.’	‘I got answers with some questions in the class using my smartphone.’ ‘It improves my knowledge by means of reading some posts and online documents.’ ‘get the meaning of unfamiliar words (through the use of dictionary application), I can also save important files in it...’ ‘I answered an online quiz through my phone.’	‘...source of information in class discussion when the teacher allows us to use our phone.’ ‘helps us use it properly and develop our learning styles...’ ‘Engages us through flexible learning’	‘Could not avoid leisure in different social media.’ ‘With friends’ recommendations... I was able to install useful and educational apps (like SHAREit) and game apps.’	‘...sometimes, it eats up much of my time. Instead of focusing on the research, we are already scrolling for fun.’ ‘Rather than reading previous lessons, I bond with my phone by playing some games and surfing net.’

Experienced (25, 28, 48)	<p>‘...For communication and educational purposes.’</p> <p>‘I have read a story from Facebook and it inspired me a lot.’</p> <p>‘...saves so much time and money.’</p> <p>‘easy to use and portable enough for studying.’</p>	<p>‘...because every time I’m connected with internet, I am connected to our Facebook group class.’</p> <p>‘we talk thru chat regarding with the topic to be discussed ... I have a term paper to do and my phone is very useful in communicating with her (classmate).’</p> <p>‘Unlocking difficult concepts in the class while in session.’</p>	<p>‘... also, online activities such as passing requirements on time and answering questions in an online website offered by our professors.’</p> <p>‘...In accessing Google docs, when our instructors asked as to do collaborative task.’</p> <p>‘Guide and Teach effectively.’</p>	<p>‘I am updated with the status of my friends and relatives. I involved myself in social... issues.’</p> <p>‘there are games that are really a distraction.’</p> <p>‘...should have enough space for important apps.’</p>	<p>‘If the internet connection is too slow, and things are limited.’</p>
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Discussion

The analysis of the qualitative interviews implies that the student teachers were very much comfortable in using their smartphone in communication, socialization, entertainment, and access to information functions. They were very much enthusiastic in learning activities involving mobile technologies (including the exploration of various smartphone academic-related apps) much more when their instructors encouraged the use of such device in and out of the classroom notwithstanding its share of disruptive tendencies and challenges. In addition, positive outcomes support what have been found in the literature. Student teachers who were mobile literate tended to try and use a wide array of mobile apps for academic and non-academic purposes which invariably offer both positive and disruptive circumstances depending on one’s way or habit of use. This study reaffirmed that apart from the communication and entertainment values of smartphones, students utilized such device also for learning and regarded it to be very helpful in their academic tasks (Dukic, Chiu, & Lo, 2015).

Integrating the use of smartphone in teacher course delivery then becomes a viable option for teacher educators/trainers to keep their students connected and to realize the potentials of this powerful mobile device. More than for personal communication, it can also be used for varied academic and personally enriching activities. The predominant hype of android smartphones among student teachers suggests likely implementation or adoption of android-based applications for university subjects. Considering the number of participants in this study, however, smartphone access tends to be the physical challenge in a university coming from a developing country. But with affordable local brands coming in the scene, equitable access may no longer be an issue. Moreover, the use of social network site with the popularity of Facebook which was practically converted to online group classes paved the way for social network sites to turn into a classroom of educational possibilities and consequences. With the guidance of their teacher educators, preservice teachers may be able to productively and strategically use their smartphone beyond its communication and entertainment value.

Aside from the academic functionalities smartphone could offer in university subjects, the interviews further exposed the social influences exerted mostly by teacher educators in mobile learning although deeper investigation is necessary. Students, may they be beginner or experienced user of smartphones, need to have an enabling environment provided foremost by their teachers who are willing to get entrenched with them in a community of practice model, for examples (Brown, 2005; Wenger, McDermott, & Snyder, 2002). The results from these particular cases, however, are not generalizable to a greater population since it was simply contextualized in a small teacher education institution. Using other methodologies, it could be interesting to explore the different conditions or circumstances and other essential

factors for smartphone users not only to a few student participants but also to include their instructors toward academically and personally enriching mobile functionalities and experiences.

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Appendix A

Sample of the interview guide

1. How do you use your smartphone for academic works/activities?
2. Do your instructors encourage the use of smartphone inside the classroom? In what ways if any?
3. Does learning with the smartphone influence your social life? Briefly explain.
4. How does your friends or classmates affect your choice and use of smartphone in a university setting?
5. What are instances that you use your smartphone for independent and/or collaborative activities?
6. What are the advantages you see in the use of your smartphone in academic related activities?
7. What are the disadvantages you see in the use of your smartphone in academic related activities?
8. How do you see (or what do you think is) the role of your instructors with the smartphone-aided environment in your course works?

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