Mobile Learning Apps to Support Students Learning Goals

Alice Etim, James Etim, Alicia Robinson and Patricia Smith

***Abstract*—**Mobile applications (apps) in general are used every day for accessing information to meet different information needs. There were 800 iOS apps in the App Store in July 2008. That number grew to 1.5 million iOS apps as of June 2015 (Costello, 2015). Mobile learning (m-learning) apps enable learning through smartphones, tablets and other portable devices (Leyden, 2015 & Anderson, et al, 2014). In this study, the researchers investigated what were the most popular m-learning apps that students at one of the Historically Black Colleges & Universities (HBCU) were adopting to support their learning goals. Some of the apps that study participants most needed or were the most used to support their learning goals included: Blackboard, Dictionary.com, Quizlet, Mathway, ITunes U, and SAT Prep.

***Keywords*—** Blackboard, digital natives, Mathway, Mobile apps, mobile technologies, m-learning, ICT, Quizlet, ITunes U, SAT Prep and Study Blue.

I. Introduction

The use of mobile applications (apps) for learning is beginning to show tangible benefits to the learner (Anderson, et al, 2014; Lepi, 2013). Introducing a child for example to a new app allows him/her to expand mental capability at a young age. This study investigated the adoption and use of apps at the tertiary level of education - one of the sixteen Campuses of the North Carolina University System. The apps, Blackboard, Mathway, Quizlet, ITunes U, SAT Prep and Study Blue were found to be the most adopted and used by the students. More than 50 percent surveyed preferred the Quizlet app because it improved their learning outcomes. It was also found that computer adoption and use is shrinking while mobile phones/apps adoption is on the rise.

II. Literature

2.1. New Instructional Strategies & Practices For Interactive Classrooms

In the Information Age and with the diverse nature of learners in our classrooms, the traditional approach to teaching is not adequate (Burkhart, 2004; Etim, 2005). The days of teacher lecturing, students' copying of notes from the blackboard, recitation of answers to questions and very little student to student interaction has now given way to interactive classrooms, high use of technology and use of multiple resources for instructional purposes. Our concept of who students are and their learning needs have also changed. The teacher is no more the "know it all" providing information to "blank slates" but rather, the literature informs us of the teacher as coach and facilitator of instruction. In their work on instructional strategies, Marzano, Pickering and Pollock (2001) list nine best instructional practices to use in a classroom to accelerate student success. One of these - cooperative learning groups - calls for the integration of content and language through group & technology engagement.

The use of ICT has been found to be beneficial for learning. According to the Milken Exchange on Education Technology (1998), technology in schools:

a. Accelerates, enriches and deepens basic skills

b. Motivates and engages students in learning

c. Helps relate academics to the practices of today's workforce

d. Strengthens teaching

e. Contributes to change in schools (pp.14-15)

In 2001, Prensky developed two terms to describe technology users in the classroom- "digital natives" (for students because they often were more knowledgeable than their teachers in ICT use) and digital immigrants for their teachers. According to Gupta and Fisher (2012), the use of different technologies in the classroom has grown rapidly and this has meant that learners "have more flexibility and autonomy to learn at their own pace and time in a highly interactive environment." (196). In their own study, Light and Pierson (2014) reported that teachers were facilitating student learning rather than merely telling them what to do when technology was integrated. As a result, "students took on more control of their own learning experience. When using Khan Academy resources, students had to make more decisions for themselves about their learning path and became more self-sufficient learners". (p. 114).

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2.2 Use of Technologies

There are a multiplicity of various types of technologies used in classrooms - from smart boards and whiteboards through the traditional computers to mobile devices. Litchfield et al (2007) posit that digital natives are adept at using mobile devices. In their study, they reported student support of the use of mobile devices for learning. As a result of this high level of support, they suggested that more time should be spent studying how best to utilize this device for instructional purposes. In another study on digital natives, Kennedy, Krause, Judd, Churchward and Gray (2006) reported the following for a sample of first year students in an Australian university-

a. Majority of students have broadband internet access (73%) and have unrestricted access to mobile phone (96%).
b. Students were overwhelmingly positive in the use of ICT to support their studies. Key activities included using a computer for general study purposes (94%), searching for information (93%), general course administration (83%) and using a learning management system to access course related materials (81%). (p. 3).

Based on these findings, the authors recommend the integration of "innovative" technologies into the curriculum so as to capitalize on student's ICT skills and interests." (p.15).

In reviewing the literature, Wang et al (2014) show what type of technology has been frequently used by what generation of digital natives in the last thirty years-

TABLE I
DEFINITION OF DIFFERENT GENERATIONS OF DIGITAL NATIVES

Digital native	Born	Technology prevalent in the generation
First generation	1980 and after	Personal computer, internet
Second generation	1990 and after	Google, i pod, e-mails, chat rooms
Third generation	2000 and after	Mobile phones, tablets, cloud computing, social networking sites.

Source; Adapted from Wang et al (2014); An investigation of middle school science teachers and students use of technology inside and outside of classrooms: considering whether digital natives are more technology savvy than their teachers, *Education Tech Research Dev* 62:637–662 DOI 10.1007/s11423-014-9355-4

In several studies (Fuad, Deb and Etim 2014; Fuad, Deb, Etim and Gloster 2016) have found the use of mobile devices very useful in encouraging active learning among students in computer science classrooms. In addition, computer adoption and use is decreasing while mobile technology adoption is on the rise. Figure 1 shows computer adoption in 1984 as compared to computer adoption in 2014.

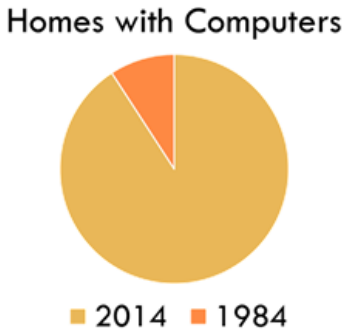

Fig. 1: Computer Adoption in 1984 and 2014

III. METHODOLOGY AND FINDINGS

Given that many of the third generation "digital natives" are using mobile devices as their main computing platform and given the ubiquitous nature of mobile phones and other mobile devices as well as its ability to improve instructional practices, this study investigated adoption of mobile learning apps and what were the most popular m-learning apps that students had adopted at one of the Historically Black Colleges & Universities (HBCU). As a classroom project in a mobile technology course for two sessions or semesters, a total of 120 study participants were surveyed. During the first session or semester, 100 students' ages 19 to 25 years, 50 male and 50 female were surveyed. They were asked if they used or had ever used three major apps that were identified in the literature as students' favorites: Quizlet, ITunes U and Study Blue for their learning needs. Table 2 shows the frequency counts of the participants' adoption of the three learning apps.

TABLE II
FREQUENCY COUNTS OF LEARNING APPS ADOPTION FOR ITUNES, QUIZLET AND STUDY BLUE

Gender	Men	Women	Total
ITunes U	12	25	37
Quizlet	34	10	44
Study Blue	4	15	19
Total	50	50	100

The results shown in Table 2 indicate that Quizlet was the most common app used by both male and female. However more woman than men used the ITunes U app while more men used the Quizlet app then woman. This Phase 1 session of the study provided insight into adoption of apps particularly those that were identified in the literature as students' favorite. In sum, preference was for mobile technology use among students and the Quizlet app was the most favored for learning.

In the second Phase of the mobile technology course, the researchers surveyed additional 20 participants. Instead of asking participants to choose from a list of apps, they were

asked to share their opinion on what apps they used for learning; what they used the apps for and which ones had more value-add to their learning. Figure 2 shows the most popular apps that were identified by the study participants.

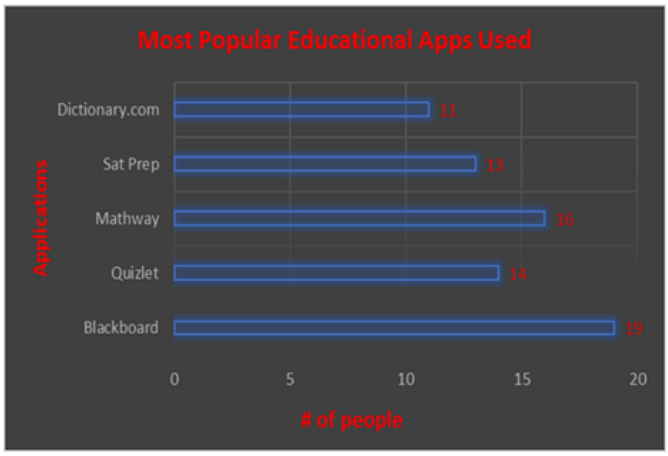

Fig. 2: Participants Identified Most Popular Apps for Learning

The findings in this Phase 2 was that Quizlet was the only app that was repeated out of the three in Phase 1. The other two very popular learning apps that were identified were Mathway and Blackboard. Quizlet was viewed as the most helpful app as it had different ways to approach the study materials such as games and flashcards. About 50 percent of the students stated that the app, Mathway did not work well. About 60 percent of the students surveyed were of the opinion that the Quizlet and Mathway apps were used by some students to cheat in exams or class work. When asked about which app(s) was the most beneficial and supportive of their learning goals, some students stated that they were unware of specific apps that could help them in the subject areas of knowledge that they were struggling with. Students who did use m-learning apps (about 90 percent of students surveyed) identified Quizlet, Blackboard, Mathway and a variety of SAT prep apps as being the most useful apps to them. Some students who did not use apps blamed their device or storage space limitation.

IV. Conclusion

The m-learning apps used by students in this study were determined to be more helpful than hurtful due to the fact that an app on a smartphone makes studying easy and on the go. The students who were unaware of apps for struggling areas had the opportunity to learn through participating in this study that there were many apps that they could use to support their learning goals and many of them had free download or minimal fees.

References

[1] Anderson, J., & Rainie, L. (2014, February 29). Main findings: Teens, technology, and human potential in 2020. Retrieved October 27, 2014 from http://www.pewinternet.org/2012/02/29/main-findings-teens-technology-and-human-potential-in-2020/

[2] Burkhart, L. J. (2004). Technology integration. Retrieved from http://www.lburkhart.com.

[3] Costello, S. (2015). How many apps are in the App Store? Retrieved from http://ipod.about.com/od/iphonesoftwareterms/qt/apps-in-app-store.htm.

[4] Etim, A (2005) Integrating Technology and the Internet in Middle school classrooms. In Etim, J.S. ed. *Curriculum Integration K-12: Theory and Practice*. Lanhan, MD: University Press of America.

[5] Fuad, M.M. ; Deb, D; Etim, J. (2014) An Evidence Based Learning and Teaching Strategy for Computer Science Classrooms and its Extension into a Mobile Classroom Response System, Proceedings of the 14th IEEE International Conference on Advanced Learning Technologies (ICALT), IEEE Press, 149-153, Athens, Greece, July 7-9, 2014.
http://dx.doi.org/10.1109/icalt.2014.52

[6] Fuad, M.M. ; Deb, D; Etim, J. and Gloster, C (2016). Using Interactive Exercise in Mobile Devices to Support Evidence-based Teaching and Learning . ITiCSE '16, July 09-13, 2016, Arequipa, Peru © 2016 ACM. ISBN 978-1-4503-4231-5/16/07

[7] Gupta, A. , and Fisher, D. (2012) Technology supported learning environments in science classrooms in India. *Learning Environments Research*, 15.2: 195-216.
http://dx.doi.org/10.1007/s10984-012-9103-9

[8] Kennedy, G., Krause, K.-L., Judd, T., Churchward, A. & Gray, K. (2006), First Year Students' Experiences with Technology: Are they really Digital Natives?, Preliminary Report of Findings, September 2006, University of Melbourne, Melbourne retrieved from https://www.griffith.edu.au/__data/assets/pdf_file/0008/39266/NativesReport.pdf

[9] Lepi, K. (2013, November 13). Can An App Really Improve Learning? Retrieved October 27, 2014, fromhttp://www.edudemic.com/app-improve-learning/

[10] Light, D., & Pierson, E. (2014). Increasing student engagement in math: The use of khan academy in Chilean classrooms. *International Journal of Education and Development using Information and Communication Technology, 10*(2), 103-119. Retrieved from http://152.12.30.4:2048/login?url=http://search.proquest.com/docview/1543749324?accountid=15070

[11] Litchfield, A., Dyson, L.E., Lawrence, E and Zmijewska, A. 2007). Directions for m learning research to enhance active learning. In ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007. Retrieved from http://www.ascilite.org.au/conferences/singapore07/procs/litchfield.pdf

[12] Marzano, R.J., Pickering, D.J., and Pollock, J.E. (2001) *Classroom Instruction that Works: Research Based Strategies for Increasing Student Achievement.* Alexandria, VA: ASCD

[13] Milken Exchange on Education Technology (1998) Technology in Schools: Seven Dimensions of Gauging Progress. http://docplayer.net/14733011-Technology-in-american-schools-seven-dimensions-for-gauging-progress.html

[14] Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9.5: 1–6.
http://dx.doi.org/10.1108/10748120110424816
http://dx.doi.org/10.1108/10748120110424843

[15] Wang, S; Hsu, H; Campbell, T; Coster, D. C; & Longhurst, M (2014), An investigation of middle school science teachers and students use of technology inside and outside of classrooms: considering whether digital natives are more technology savvy than their teachers, *Education Tech Research Dev* 62:637–662 DOI.
http://dx.doi.org/10.1007/s11423-014-9355-4