DECISION SCIENCES INSTITUTE
Experiences of Integrating a Mobile App into a Computer Concepts Course

Toritsemotse Okorodudu
Northern Kentucky University
okorodudut1@nku.edu

Anthony Burk
Northern Kentucky University
burka@nku.edu

Teuta Cata
Northern Kentucky University
catat@nku.edu

ABSTRACT

This article discusses the experiences of integrating a mobile app into a computer concepts course in a university. As the use of any mobile app is a user choice, this article discusses what was done to hopefully motivate the student to use the app to further enhance their learning experience.

KEYWORDS: Mobile Apps in Higher Education; Mobile and Learning; BlackBoard Mobile App.

INTRODUCTION

The ubiquitous nature of mobile devices makes it a very important tool to consider for enhancing user's knowledge about products and services. Over the years, there have been sporadic increases in the number of mobile apps that enhance the learning of certain topics. In the clinical setting, using personal digital assistants (PDA), students could evaluate drug-to-drug interactions and check medical databases, instantly ensuring that patients are receiving appropriate information on drugs prescribed upon discharge and the most appropriate laboratory tests. It also allowed students to review psychiatric issues relevant to their assigned patient. Medical students are more inclined to download healthcare mobile apps and use them for learning, such as regular study, reviewing for exams, or taking notes (Masika et al. 2015). Also, using mobile apps to prepare for certification exams is becoming a favored trend amongst candidates as they feel it is highly conducive to learning on the go. Candidates that used mobile apps to prepare for the CPA exams found it very effective, as the app provided features such as performance tracking, flashcards and questions from previous exams. The app was updated regularly, so students had the most current information available to them (Anders 2016). The level of responsiveness to messaging apps or even traditional text messages will gradually sway the trend of mobile learning in that direction. Instant messaging apps are a convenient way to communicate, as group chats can be created to disseminate information to large groups simultaneously. Their cost-effective nature has made messaging apps like WhatsApp a useful tool for some students to share information and documents for their semester team projects. WhatsApp has over 100 million downloads, Kik, over 50 million, and the number of downloads is expected to continue rising.

Ubiquity and convenience are the most important elements that move individuals to use mobile apps for educational activities (Dew, 2010). These two features help individuals to combine leisure, work and learning all at once by means of their mobile devices. The availability of mobile devices and the Internet have made Mobile learning (or m-learning) via mobile apps a very significant issue which needs to be studied to find out its effect on various forms of education. Consumers tend to trade the high risk involved with using mobile apps for convenience and availability (just-in-time information). This is because quick access to learning materials is the most significant potential of the mobile technology (Herrington et al., 2012; Herrington, Ostashewski, Reid, & Flinoff, 2014). In recent times, the m-learning trend has cut across every form of learning from formal to informal learning. Furthermore, mobile apps are used by individuals and students to prepare for certificate examinations, collaboration amongst classmates and team members during semester long projects, and to administer quizzes by lecturers. However, students still prefer to use their laptops for assignments and to study, as they feel it is more convenient and has a better display (AlTameemy, 2017). An important factor with mobile app learning is that it offers users the ability to use the app offline on their mobile devices and has the capability of tracking users' progress as well. Though mobile apps for learning may not completely provide the resources individuals need for learning or exam preparation, it is essential to provide a significant amount of performance support to individuals and candidates using it.

MOBILE APPS AND CERTIFICATE EXAMS

Mobile apps have been used by various candidates or students in preparation for certification exams because of its ease-of-use, availability, the ability to function offline, and prompt access to current information. Many certified board exams have adopted, or are trying to develop, mobile apps that will assist candidates in the preparation of such exams. In October 2016, the American Board of Urology (ABU) promised to release a mobile app that would help students prepare for the Board exams. They promised to include questions, coaching sessions, a timer to make the practice intense like a real-life exam environment, amongst other features (Nitti, 2016). The use of mobile apps is very common in the field of nursing, as there is so much to learn and the nurses need to be in tune with recent data relating to handling patient care and medications. Apps like the Med Mnemonics help nursing students learn and memorize medical terminology that is required for their career and everyday activities. However, when it comes to thorough analysis and research findings, candidates would prefer to use a website via a computer rather than using a mobile app.

MOBILE APP AND LEARNING

Since most of the population in the present generation grew up owning or having access to video games and almost unrestricted access to the Internet, it is assumed that mobile devices will be an important learning resource. Mobile apps as learning tools allow students and individuals to quickly and easily access current information, enhancing student or individual responses to homework, classes, and other educational activities. In addition, educational apps need to be designed and evaluated in a way that best promotes learning. For example, apps can be designed to teach students how to perform domestic chores, teach them about the environment, different cultures, food, social interactivity, or new languages. (Hirsh-Pasek et al., 2015). Mobile apps for education should solely serve its purpose in a positive manner. Furthermore, rather than using a formal, educational style format for the apps, they can be modeled after social media apps, making learning with them more interesting and fun (Kim D,

Rueckert D, Kim DJ, Seo D., 2013 and PATIL, R. N et al., 2016). In addition, a quality control policy must be put in place to monitor the value proposition and content of all educational apps released into the market every day, to verify if it is serving its purpose and what would be the short and long term effect on its users. We must consider whether the idea behind the app is truly for education or purely for profit (Hirsh-Pasek et al., 2015).

MOBILE APP IN HIGHER EDUCATION

The pervasiveness of mobile devices has made it very important for universities and other institutions of higher learning to incorporate mobile learning apps into curriculums and other classroom activities or lectures. Almost every student owns a smartphone and most students do not need to read the manual to learn how to operate their mobile devices. Therefore, integrating mobile apps into the study plans for students would not be a question of familiarity, or how to operate the device any longer, but how the usage could be more effective and productive for the students. Though, most faculties see smartphones as a distraction for students during the class period and worry about the content students might share amongst themselves, as well as the fear of being eliminated from the entire collaborative process (Khaddage, F. et al. 2009 and 2011). However, the instantaneity and the level of reach through which mobile apps delivers information to its users makes integrating it into today's learning process necessary for institutes of higher education. In recent times microblogging has become one of the ways in which mobile apps could be used by instructors to communicate and collaborate with their students. Instructors use microblogging through Twitter to create hashtags to create discussion topics, while students subscribe to the hashtags to post their comments and discussions to enhance further dialog with fellow classmates and their lecturers (Menkhoff, T. et al 2015). In the meantime, Game-Based learning is becoming rampant as it integrates the look and feel of a mobile gaming environment into educational apps. Inculcating the gaming experience gives students the opportunity to compete with other classmates and build ranks or levels according to questions answered correctly or other grading criteria. In a research paper, the ImparApp was used to enhance student learning of Italian after a one week in class coaching with an instructor. Students were exposed to quizzes, weekly challenges, and task through the app (Morini, L. et al 2016). Mobile educational apps have also been seen to promote distance learning in colleges. According to Wei (2016) in China, the WeChat app was used to foster distance learning of Folk Literature, where students were exposed better information and other resources, convenient access to one-on-one interaction, as well as group discussions with instructors and another classmate.

THE STUDY

This study will use a two-phase data collection approach. Firstly, we will collect data on students' performance while they use mobile devices for class assignments and exams. Secondly, we want to survey their perception to see if mobile devices enhanced the learning process.
The focus of the first phase of data collection is to find out if the students' learning improves by using mobile devices and learning apps. The data collected in this phase of the research happened in a freshman class titled: Computer Literacy and Informatics. The university's online catalog description is: "Understanding the basic concepts of informatics in a context including computer technology; examination of hardware and software; impact computers have on society including employment, privacy, ethics, and security; working with information as a resource."

The course includes computer laboratory exercises in Office (Word, Excel, PowerPoint, and Access) and Internet technology applications.

The Computer Literacy course is a required course for students majoring in numerous programs in the College of Business. The course is taught in both formats, online and traditional setting, but the data collection happened only for the traditional students, who were taking their quizzes via mobile devices in the classroom setting.

Students used the mobile app "Bb Student by Blackboard Inc." in three of the traditional classroom settings.

Challenges of teaching a Computer Literacy class:

As a first-year computer concepts course, some of the challenges in teaching the course to today's students:

- The student already feels they are computer literate based upon their current smartphone app usage
- The student already feels they are computer literate based upon their prior schooling, personal computer, Mac, or gaming experiences
- Numerous students enroll in the course and attend the first few sessions, do not complete any required course material, and do not withdraw by withdraw date and subsequently fail the course
- Lack of attendance of class
- Engaging students to realize their need to continue to learn new computer related skills because of the daily new technological changes
- Although they may know many of the concepts covered, they must be to demonstrate their knowledge of the materials by successful completion of the required materials
- Somehow to motivate the student who is not sure why they are taking this course to peak their interest enough for them to want to complete the course
- Cover the required materials in a manner the student feels there is a benefit to them for completing the course
- Getting students to actually access the required course materials through the university's Learning Management System (LMS) Blackboard in a timely manner
- Stop accessing or little access of Blackboard for the class materials during the semester

The Computer Literacy class is a "Web-Enhanced" course. Meaning the student was required to sign on to the university's Blackboard Web for access to MyITLab with Pearson eText, all announcements, schedules, assignment handouts, lecture notes, and other course material. It was the student's responsibility to check the class Blackboard web page on the campus Web site on a daily basis to keep abreast of any changes or critical information.

The LMS used for the class was Blackboard. Once a student logs on to Blackboard to go to their specific class there is an element: Free Blackboard App for Students, which advertises the availability of the mobile app. It provides a link: https://help.blackboard.com/en-us/Bb_Student. If the student goes to the link, this is their first encounter with to the mobile app "BB Student". During the first of the four course sections of the Computer Literacy class, the students were made aware of the availability of the BB for Students app. The students were instructed that the app to be used for future in-class quizzes at a later date, and that they should download the student app before the first lab. The students were also polled in both classes on their availability of a smartphone to be used during class. No student in either class stated in class or in private they did not have access to a smartphone. Also, the students were polled on the platform of their smartphone. All students responded their phones were Apple using IOS or Android. No student said they were using a windows smartphone.

Eight multiple choice quizzes were given during the semester for the Computer Literacy class. For all four sections for Quizzes 1 - 4, the quiz was given via PowerPoint and the students submitted their answers on a provided paper answer sheet. The quiz was then graded by one of graduate student teaching assistants typically within 1- 3 school days. The mobile BB student app was available to take Quizzes 5 – 8 for all four sections. Quizzes 5 - 8 contained questions worth the same value as paper based quizzes. All quizzes were timed allocating one minute per question including extra credit questions. If extra time was needed the student was still able to complete the quiz after instructor verification to post the grade. This happen less than six times for the total of all quizzes 5 – 8.

The quizzes all used the same questions for each student, although the question order was randomized. The only issues encountered when taking an actual quiz was when a student was not sure of what to select when prompted to submit something other than the quiz question answer. This question was always answered immediately by other student nearest to the student, before the instructor was able to see the actual screen being questioned.

Students who searched on the IPhone using only on Blackboard were shown the Blackboard Mobile Learn™ app first, followed by the Bb Student by Blackboard app. Several then downloaded the Mobile Learn™ app, which was an older version and was not compatible with the university Blackboard LMS version. We were unable to count the number of students who downloaded the wrong app.

After taking quiz 5 in one of the four class sections, students were given the option to use a classroom desktop computer, a personal laptop or Mac, or their smartphone mobile app to take quiz 6-8. The majority of students chose not to take quiz 6-8 using their mobile app. Throughout the semester, the students were observed using their smartphone to lookup grades, assignment due dates, and test dates. However, due to the size of the classroom this observation was only possible in the lab.

Preliminary Results on the Data Collected

A preliminary analysis on the data was done by using a Paired T-Test analysis to compare the results of the quizzes taken on paper versus via Mobile Apps by 84 students who were enrolled in the four sections of this course. There is no statistically significant difference between the two conditions.

Paired Samples Test

Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	VAR00003 - VAR00006	-.90476	5.65178	.61666	-2.13127	.32175	-1.467	83	.146

Although the authors were expecting that the performance in quizzes would not affect the students' quiz scores, we believe that the mobile app usage in the classroom setting will enhance their learning experience and the attention paid in the course towards learning. Therefore, we want to analyze the data collected this semester much deeper and pair it up with the comments given at the end of semester in the course evaluation. Text analysis used on the

course evaluation data will help the authors identify issues with the formats of the quizzes: paper based and mobile app ones, and improve the testing methods in the future semesters. Furthermore, we want to collect data on the students' perception of using mobile devices towards their learning experience. A survey questionnaire is designed to collect data in the next semester and analyze their responses in order to better understand their experience in learning while taking this course. A draft of the survey is attached as Appendix 1 at the end of this manuscript.

Lessons Learned and Implications for Future Semesters

The data collected in this study will help university instructors to look for contemporary methods of testing and understanding the learning experiences of their students. Instructors need to announce the availability of the Bb Student mobile app, emphasizing its ease of use to interface with the class Blackoard materials. The number of quizzes on-line will increase with the goal for all quizzes to be given via Bb for student app. The quizzes content may need to be made be more random, choosing each students' questions from a random pool, making each quiz unique to each student.
Students will fill out a survey to give specific feedback on the usefulness of the mobile app, how it was used, and how a student thinks it could be used in the future in a computer concepts course, or any course. Research on what other mobile apps may be available for use in a computer concepts course should be done in order to enhance the computer experience for such courses.

CONCLUSIONS

This study elucidates the usefulness of the mobile app for educational purposes; it is evident that the importance of mobile apps for education cannot be over emphasized. A major factor as to why the use of mobile apps has become a success in recent times is its ease of use, convenience, availability, and portability. Individuals can use mobile apps offline to prepare for their exams, view scores, take mock exams, and even gain access to a one-on-one coach based on performance.
The use of the Bb Student mobile app should be expected enhance the way students interact with the university courses, contents, instructors and other students.
Although there was a definitive benefit to the instructor, with the elimination of manually graded quizzes, by the students use of the mobile app "Bb Student by Blackboard Inc", there was no definitive quantitative analysis able to determine a measurable benefit to the students for the semester. Further expanded usage of this mobile app in one or more semesters is needed with specific usage feedback and comments requested of the students to better measure the effective results for the students use of this mobile app.

References:

AlTameemy, Farooq. *Journal of Educational Technology Systems.* Mar2017, Vol. 45 Issue 3, p436-451. 16p. 3 Charts

Anders, S. B. (2016). Free CPA Exam Resources. CPA Journal, 86(8), 64-65.

Day-Black, C. (2015). Using Mobile Devices in Nursing Education. *ABNF Journal*, *26*(4), 78-84. Eppard, J., Nasser, O., & Reddy, P. (2016). The Next Generation of Technology: Mobile Apps in the English Language Classroom. International Journal Of Emerging Technologies In Learning, 11(4), 21-27. doi:10.3991/ijet.v11i04.5293

Herrington, A., Schrape, J., Flintoff, K., Kelly, J., Singh, K., & Taylor, D. (2012). PD for ML in HE: Embedding mobile learning in a university context. In T. Amiel & B. Wilson (Eds.), Proceedings of EdMedia: World Conference on Educational Media and Technology 2012 (pp. 2573-2578). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE)

Herrington, J., Ostashewski, N., Reid, D., & Flintoff, K. (2014). Mobile technologies in teacher education. In M. Jones & J. Ryan (Eds.), Successful Teacher Education (pp. 137-151). Rotterdam, The Netherlands: Sense Publishers.

Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting Education in "Educational" Apps: Lessons From the Science of Learning. Psychological Science In The Public Interest, 16(1), 3-34. doi:10.1177/1529100615569721

http://josotl.indiana.edu/article/view/2023/1985

https://www.goconqr.com/en/examtime/blog/mobile-learning-apps-future-of-education/

Khaddage, F., Lanham, E. and Zhou, W. (2009) "Mobile Phones as a Learning Device, Is It Time to Stop the Ban?" IADIS International Conference of Mobile Learning 2009 Proceedings p347 Barcelona, Spain, ISBN: 978- 972-8924-77-5

Khaddage, F., Lattemann, C. and Bray, E. (2011) "Mobile Apps Integration for Teaching and Learning Are Teachers Ready to RE-blend?

Kim D, Rueckert D, Kim DJ, Seo D. Students' perceptions and experiences of mobile learning. Language Learning & Technology. 2013;17(3):52–73.

Masika, M. M., Omondi, G. B., Natembeya, D. S., Mugane, E. M., Bosire, K. O., & Kibwage, I. O. (2015). Use of mobile learning technology among final year medical students in Kenya. Pan African Medical Journal, 211-12. doi:10.11604/pamj.2015.21.127.6185

Messaging May Be the Next Killer App for Learning. (2013). T+D, 67(8), 13.

Morini, L., Charitonos, K., Arnab, S., Wilson, T. C., Brick, B., Bellamy-Wood, T., & Van Leeuwen, G. (2016). ImparApp: Designing and Piloting a Game-Based Approach for Language Learning. Proceedings Of The European Conference On Games Based Learning, 11005-1009.

Nitti, V.W. (2016). Certifying Examination (Part 2) Preparation. *Auanews*, 21(10), 34

PATIL, R. N., GUJRATHI, A., GOSAVI, S., ALMALE, B. D., PATIL, M., DHAKNE-PALWE, S., & PATIL, A. R. (2016). Attitudes and Perceptions of Medical Undergraduates Towards Mobile Learning (M-learning). Journal Of Clinical & Diagnostic Research, 10(10), 6-10. doi:10.7860/JCDR/2016/20214.8682

Thomas Menkhoff, Yue Wah Chay, Magnus Lars Bengtsson, C. Jason Woodard, Benjamin Gan (2015) Incorporating microblogging ("tweeting") in higher education: Lessons learnt in a knowledge management. Computers in Human Behavior, October 2015

Wei, S. (2016). Construction and Application of WeChat Learning Platform in "Folk Literature" Teaching. International Journal Of Emerging Technologies In Learning, 11(5), 10-15. doi:10.3991/ijet.v11i05.5688

Appendix 1: Survey questions:

I would get benefits in my learning if M-learning is used
I believe that M-learning provides me with rich resources
 I think M-learning provides massive education for learners
I believe that M-learning may saves my effort
I think M-leaning is easy to monitor the teaching and learning process
I believe M-learning works well with my study plan/program
 I think M-learning provides efficiency in learning
I think M-learning should be supplementary to traditional teaching-learning
M-learning needs well prepared mobile materials
M-learning is effective in terms of creating a personally meaningful learning experience for me
I think M-learning minimizes the cost of teaching and learning
 M-learning needs variant teaching strategies
 M-learning requires crucial technological infrastructure
would feel comfortable taking courses through mobile devices
I think M-learning will save my time
I prefer M-learning to traditional learning
M-learning needs sufficient ground work
I think M-learning enables me to attend classes more frequently than traditional learning 96
 I believe that I learn better through M-learning material than through lectures
I think M-learning enables me to understand the subject more than the traditional style of learning
 I would like to have teaching-learning using the M-learning
M-learning requires significant changes by the student
M-learning poses difficulty in monitoring the evaluation process
M-learning hinder contribution to classroom discussions
 I think M-learning is uncomfortable for me
M-learning reduces teamwork and collaboration between students
 M-learning causes fragmentation of work and loss of consistency in learning
M-learning causes decline in learners' academic performance
M-learning will not offer any advantages to me
M-learning will bring new opportunities of learning
M-learning will be more flexible method of learning as it can be done anytime, anywhere
M-learning can be an effective method of learning as it can give immediate support
M-learning is a quicker method of getting feedback in learning
M-learning will improve communication between student and teacher
M-learning cannot be used for learning due to: Expenses involved in Mobile learning
Poor internet network (for mobile) in the city
Unavailability of mobile phones with a larger number of students