Mobile Technology and Application Trial Action Research Report

INTRODUCTION

In December 2010, nearly 47 percent of mobile subscribers in the U.S. were mobile media users - up 7.6 percentage points from the previous year. (comScore) Mobile media users access the Internet for information or downloads from their mobile devices or use applications (apps) on their devices. Because the share of smartphone and mobile tablet users has exploded over the last 3 years, many companies are scrambling to develop mobile applications for their customers and their employees. For example, ninety-one percent of online retailers in the US have a mobile strategy in place or in development, according to Shop.org/Forrester Research. Furthermore, research group Gartner says that the mobile app business will soon hit over $6 billion in annual sales. (Dvorak) This is a promising indicator for those entering the information technology field. Companies have evolved how they interface with their customers from personal contact, mail, and telephone, to email, websites, and social media like Facebook and Twitter. Now they must continue to evolve to interact with customers using mobile applications. Today’s IT professionals need to possess the development skills to meet this challenge in this new era.

THE CONTEXT

WORK/COMMUNITY CONTEXT

Within this new era of mobile computing, how can educators prepare our future IT professionals to be able to design and develop mobile applications? An essential aspect of computing education is that it must continually evolve with industry trends. Mobile computing is the newest, most significant paradigm change. New hardware, operating systems, development platforms, programming languages, user interface elements, design tools and patterns must be learned.

As a professor of Information Technology at the County College of Morris in Randolph, NJ, I am challenged continuously to learn and adapt to new technologies and then to share this knowledge with my students. While mobile technology has been addressed briefly in our curricula, there has not yet been a significant addition of this paradigm to our courses. Identifying this deficiency, I have made progress in infusing mobile technology development processes with the Mobile Technology and Application Trial in CCM’s IT Systems Analysis & Design course.

LITERATURE REVIEW

Much is written about incorporating mobile technology in education and about the interaction of
students and institutions through mobile technology, but little research is found on what educational institutions are doing to prepare students to develop mobile applications. One of the outcomes of Mobile Technology and Application Trial is to share with others ways to introduce the mobile application development process to students.

THE RESEARCH

ACTION RESEARCH QUESTION

How can we introduce CCM Information Technology students to the mobile application development process?

IMPLEMENTATION PLAN

The overall implementation plan for this trial was to utilize ten institution-owned iPADs in the CCM Systems Analysis & Design (SAD) course. A three-part plan was formulated to try different experiments using mobile applications.

Part 1. The first experiment used iPAD apps to help brainstorm ideas for student team projects. The SAD course utilizes a semester-long team project in which students plan, analyze and design a software system. Each project has at least two “customers” – the instructor and at least one other outside person. Teams select a system and create a project plan, system requirements and system design models. Apps of different genres were installed on the iPADs and students were given one class period to explore apps and generate project ideas. Teams then selected a project, created a project proposal and presented their proposal to the class in another class meeting.

Part 2. The second use of iPADs in class was during an analysis exercise. An app was selected to be used as a case study for creating a System Context Diagram (SCD), an analysis model that describes high-level system inputs and outputs. Students used the app and then used a desktop modeling application to create the SCD.

Part 3. In the third experiment, students used an iPAD app called iMockUps to design their graphical user interface (GUI) for their projects. For each app feature, students created screen prototypes (mockups) with iMockUps. Students then shared their GUI prototypes with their customers and solicited feedback.

REPORT OF CYCLES OF RESEARCH

Several questions were posed in this trial.

Question 1. How experienced are our IT students with the use of mobile apps and are they interested in learning how to design them?
I expect that a large number of students will have had experience with apps. Since mobile devices are relatively expensive and a large percentage of community college students are on financial aid and non-traditional, I assume accessibility will be an issue for some students. The outcome of this experiment will be measured by a survey given at the start of the semester.

**Question 2. Will the availability of iPADs and a diverse set of apps improve the project brainstorming and proposal process?**

In previous semesters the SAD project brainstorming activity was sometimes non-productive and it even became a contentious activity for teammates to agree on one idea. Sometimes projects were vague and ill-defined, causing communication and quality issues in project modeling exercises. I had expected that use the iPad app examples would help teams crystallize their ideas and reach consensus more quickly and that all teammates would have a better understanding of the features of their project, thus improving the quality of their analysis efforts. The outcome of this experiment will be measured by the comparing quality of the project proposal and presentation to previous semesters.

**Question 3. Will the availability of iPad apps improve the engagement of students and outcome results in analysis and design modeling activities?**

Most students enrolled in the SAD class have little experience with the software development lifecycle process. While the pre-requisite for the course is one college-level programming class, most students have little experience planning, analyzing and designing a software application. Furthermore, most students come to class with a lack of understanding of the importance and relevance of these activities. It is sometimes a challenge to engage their interest and motivate them to learn topics that are foreign to them. By using interesting and fun apps for case studies, I suspect that it will engage students better and they will be more motivated to learn and achieve. The outcome of this experiment will be measured by comparing grade performance to previous years and by subjective observation of student engagement and enthusiasm.

**Question 4. Will an iPad app for creating Graphical User Interface mockups improve the quality of each team’s analysis and design models?**

It has been a challenge in the past to find an application that allows students to easily create GUI mockups of their application designs. Available desktop and web-based tools are either too complex or too cumbersome to allow for quick production of prototypes. With an easy-to-use app, the GUI prototyping process should help students better understand their system requirements and design and be able to share these ideas with their customers. The outcome of this experiment can be measured by comparing team project grade performance to previous years.

**EVIDENCE USED TO EVALUATE THE ACTION**

*What evidence will you collect to tell you how others respond to your action? Where will you look for direct or indirect evidence of what happened?*
A survey amongst the twenty students in the SAD class was taken prior to introducing the mobile application experiments. According to this survey, 85% of students had used an app on a smartphone or tablet device. 100% of those users had played a game on mobile technology, 91% had accessed another type of entertainment app, and 82% had used a both social media and news/weather apps. 77% of students reported that they would like to learn how to design an app. 69% thought it was somewhat or important to their education to learn how to design an app.

A comparison of course completion rates and average final grades will be compared for the Fall 2010 and Spring 2011 semesters. Introducing mobile technology in the Spring 2011 semesters was the only variation from fall to spring. All other factors remained the same including the instructor, class size, textbook, supplemental materials, assignments and exams. Fall 2010 had a course completion rate of 89%; Spring 2011 had a course completion rate of 100%. Fall 2010 had a final grade average of 74 while Spring 2011 had an average of 84.

SAD students in the Spring 2011 were engaged and enthusiastic of using the mobile technology and having the opportunity to design their own app. There was a noticeably improved attitude and involvement in team project activities.

EVALUATION

I had expected that a large number of students would have had experience with apps, but I did not expect that all of them would have experience. The incorporation of mobile technology and development activities in the SAD class appeared to have improved course completion, student outcomes and student engagement and enthusiasm.

REFLECTION

I was surprised that every student had experience with mobile apps. I expected that they would be enthusiastic about designing their own app and that this enthusiasm would result in improved outcomes. This appeared to be the case. While the comparison of the two semesters shows a significant difference in their course completion and performance, the sample size is small (20) and the incorporation of mobile technology may not be the only explanation for these results. It was very clear however that students were very excited to be using and learning about mobile technology and app development techniques.

Since I plan to continue to infuse this course with mobile technology and development techniques, I will continue to use the iPADs for the project brainstorming activity and to increase the use of iPAD applications for analysis and design case studies. However, I may consider using some other GUI mockup tool since accessibility to this app was only in the classroom and it took multiple class sessions to complete this activity.
**FINAL REFLECTION**

When I compare the outcomes along with engagement and involvement of the Spring 2011 students to previous semesters, I am encouraged that the experiments used in this research effort proved to be successful. My initial quest in this effort was to determine what was the best way to introduce the CCM IT students to mobile technology and the associated development process. I was focused on making sure that students learned the necessary skills and techniques. I was not pursuing this research with the sole purpose of improving outcomes. I was not expecting that not only would they learn about this technology but that they would grab onto it and run with it and that it would result in improved outcomes. Future research will include how to increase mobile technology infusion into this course as well as others as a method to prepare students for a new era of computing as well as a method for increasing student outcome results.

**REFERENCES**


