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2014

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Mobile Technology Integration

Shared Experiences From Three Initiatives

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INTRODUCTION

Mobile devices and tablets are fundamentally changing the way students of all ages collaborate, communicate, participate, and ultimately learn. In order to attract highly qualified students, colleges and universities must offer a curriculum that is engaging and sustained by the latest technological advancements. To facilitate the use of mobile devices and evolving curricular needs, educators must learn how to integrate the newest tools and apps within their courses. They need to understand how to develop and use an iCurriculum, tailored specifically for digital learners, and infused with mobile technologies and skills that students can immediately put into practice (21st Century Learning Solutions, 2013).

This article offers an overview of the process involved in envisioning, developing, and integrating mobile technology into the curriculum at two institutions of higher education and a public charter school.

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LITERATURE REVIEW

Tim Flood, former director of information systems for the student affairs division at Stanford University, captures the impact mobile technology is having on higher education: "If you can't carry it with you, why have it'? These are the consumers of today's education. Woe to the institution that does not heed this trend" (as cited in Raths, 2013, p. 5). He concludes with a powerful question that all administrators should ask themselves: "If I have a choice, will I choose to attend the college that appears old and out of touch or one that seems to get where I'm at?" (as cited in Raths, 2013, p. 6).

Schrum and Glassett (2009) suggested that information and communication technologies can play a central role in empowering students to demonstrate authentic, meaningful learning. As part of the Apple Classrooms of Tomorrow study, Sandholtz, Ringstaff, and Dwyer (1997) developed a five-tier model for technology integration: entry, adoption, adaptation, infusion, and transformation. According to Cavanaugh,

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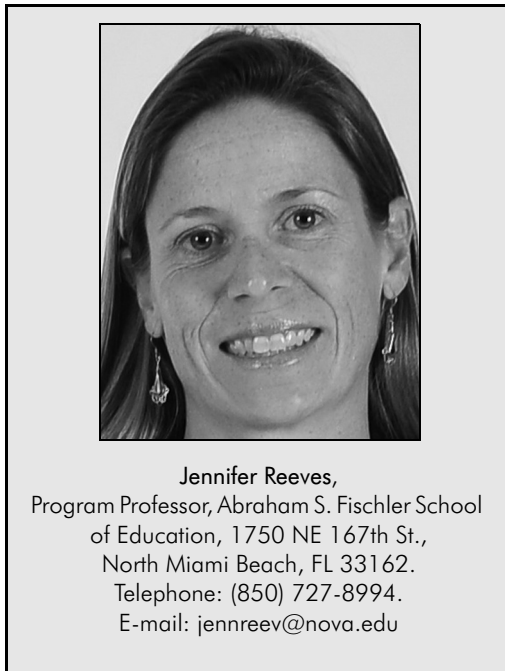Telephone: (850) 727-8994.
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Hargis, Munns, and Kamali (2012), "In order for new approaches, tools, resources, and environments to transform pedagogy in ways that facilitate student-centered, engaged, meaningful learning, they must be adopted, adapted, and infused in practice by educational institutions" (p. 4).

In a review of the research on student engagement, Prince (2004) reported that student engagement was consistently correlated with increased learning outcomes. Although little empirical evidence exists on mobile technologies and the effects on engagement, a few studies (e.g., Chen, Lambert, & Guidry, 2010; Nelson Laird, & Kuh, 2005) found student engagement increases with the effective use of educational technology. Diemer, Fernandez, and Streepey (2012) specifically found a positive correlation between perceived engagement and perceived learning while using iPads in the classroom. In addition, Diemer et al. also found students who were uncomfortable using mobile technologies for learning at the beginning of the study reported interest in continuing to use iPads in the future, suggesting that although discomfort might initially be a barrier, it is one that can be easily overcome.

THE PROJECTS

Experiences envisioning, developing, and integrating digital media and technology within three projects informed the content of this article. The first project took place at Nova Southeastern University (NSU), a large, private, not-for-profit university in Fort Lauderdale, Florida. The second project took place in a prekindergarten class at Big Pine Academy (BPA), a public preK-3 charter school in Big Pine Key, Florida and the third project took place at the University of Central Florida (UCF), a large public institution of higher education in Orlando, Florida.

The NSU and BPA initiatives stemmed from a brainstorming focus group with fac-

ulty at NSU in the Spring of 2012. The purpose of the session was to envision the future of education. One of the ideas that resulted from that focus group was giving every faculty member and every incoming student an iPad, fully loaded with everything needed to complete their program. None of the colleges or schools at NSU had implemented this innovation. In trying to establish a collaborative research agenda, the researchers envisioned pilot studies using mobile technologies with two convenience samples: NSU's Athletic Administration Master's program, where one of the researchers oversees the curriculum; and BPA's Voluntary Prekindergarten program where one of the researchers is a parent-volunteer.

The third project took place as part of a teacher preparation program at UCF, the second largest public institution of higher learning in the country. The UCF initiative encompasses the Instructional/Educational Technology programs, which include master's and certificate programs in Education Technology and eLearning, and the state mandated undergraduate technology course, EME 2040—Fundamentals of Educational Technology. The course is offered in over 20 sections to approximately 800 students a year. It is a certification class for teachers who desire to become highly skilled at successfully integrating technology into the K-12 curriculum.

During 2007, the Florida Legislature amended Florida Statutes implementing a technology fee of up to 5% to support the instructional technology implementation. At UCF, faculty, student organizations, and administrative staff can apply for funds to assist with technology needs from this Student Tech Fee. A Tech Fee grant was written and submitted by one of the researchers to create a mobile learning initiative for teachers in UCF's College of Education (CED). The project was the first of its kind in the CED and was funded in 2012. This funding was used to purchase

two iPad carts with 50 iPads, iPad apps, and other devices to be used as teaching and learning tools for preservice and in-service teachers. The other UCF initiative was to make sure the undergraduates in EME 2040 were also exposed to mobile devices by focusing on using the iPad for skill building in their area of certification.

Because these are evolving projects, this article focuses on the early successes, mid-course challenges, and future directions for these initiatives. These are important considerations as these projects support the creation of a paradigm shift in the way these projects were envisioned, designed, and implemented.

THE PROJECTS: EARLY SUCCESSES

Looking back on evolution of the three projects, it is clear that three constructs framed the early successes: the evolution was serendipitous, the development was collaborative, and the support was ongoing.

THE EVOLUTION WAS SERENDIPITOUS

In October 2012 the researchers scheduled a meeting with the dean of NSU's School of Education. The purpose of this meeting was to propose the Athletic Administration Master's iPad initiative. Serendipitously, just 1 hour prior to the meeting, NSU's chief information officer and the executive director of the Office of Information Technology Innovation and Collaboration came to the faculty meeting to discuss recruitment and retention of students. Their discussion focused on describing today's student as: someone who is working on an iMac, surfing the web on an iPad, and communicating with an iPhone, all at the same time. They stressed that NSU must be ready to meet the educational needs of the digital generation. One hour later the researchers presented their proposal to the dean, who had attended the presentation. He readily agreed to pur-

chase 10 iPads for the researchers and program faculty. The project would begin with iPad training focusing on identifying the resources needed to rewrite the curriculum to integrate mobile technologies.

While volunteering with BPA's Pre-K class, one of the researchers approached the principal and the Parent Teacher Organization (PTO) about buying iPad minis for every classroom. By the end of the month, 25 iPad minis were purchased for the charter school (2 for each of the 11 classrooms, and 3 for each of the ESE/Gifted/SLP teachers). These were parents who recognized the importance of technology in their children's future and were eager to fund the project.

There were two serendipitous moments during the UCF initiative: integration projects and the ripple effect. Preservice teachers in the state-mandated technology course were exposed to mobile devices by focusing on using the iPad for skill building in their area of certification. For the final course project, students can choose any technology to integrate into their lesson plan. However, it was unforeseen over that 50% of the preservice educators would choose to create their integration lesson using the iPad. This was the first time preservice teachers integrated mobile devices in an integration project.

Similarly, all in-service teachers enrolled in the Educational Technology master's program at UCF are required to complete subject specific curriculum integration projects in their area of certification (e.g., science, language arts, mathematics, etc.). In fall 2012, for the first time, in-service teachers were required to integrate iPads into their subject specific curriculum. In learning to use the technology each new demonstration of an app or a technique flipped the "lifetime learner" switch within the educators. Students gravitated to the touchscreens with the enthusiasm of digital natives and the experienced wisdom of those always on the lookout for new ways to teach and learn. A course

assignment serendipitously resulted in a new way of thinking about learning.

In addition, when the in-service teachers went back to their home schools spreading this new enthusiasm about iPad possibilities and teaching strategies, a ripple effect occurred: the teachers and school administrators began purchasing iPads for the classrooms. Several teachers even applied for and were awarded grants to purchase iPads for their classroom.

THE DEVELOPMENT WAS COLLABORATIVE

Because the curriculum for the Athletic Administration program is being redesigned around the use of the iPad, the effort has been fully collaborative. The faculty are working with the researchers in designing and writing their courses. A wiki has been established to support communication and share information. The researchers designed a series of predesign assignments that allow the faculty to explore the devices through web quests and data collection. Everything is shared. Training and information meetings are held using Blackboard Collaborate so everyone is able to attend.

At BPA the PTO and the principal collaborated to fund the initiative and the principal collaborated with the researchers to ensure the most appropriate devices (i.e., iPad minis) were purchased. Since the iPad initiative is being implemented schoolwide, all teachers are involved. The researchers have collaborated on two trainings with the BPA teachers: an introductory training and curriculum integration training.

After seeing the success of integrating iPads into the curriculum in the instructional technology programs, other faculty in the CED at UCF have become interested in learning more about the iPad because they see its application to their own curricular areas. Next year, one of the researcher's focuses will be collaborating

with faculty in integrating the iPad using different instructional strategies across CED programs at UCF.

THE SUPPORT WAS ONGOING

The willingness of the dean of the School of Education to fund the NSU's Athletic Administration project was a testament to the level of support offered by the university. Additionally, the university offers the highly competitive President's Faculty Research and Development Grant for innovative research. Once the pilot studies are completed, the researchers will be able will be able to expand their initial data collection by applying for this grant.

At BPA, the principal is continuously supportive and committed to making the initiative a success. The PTO was supportive with funding the initiative and the researchers are supporting the initiative by providing teacher training and an iCommunity where teachers can learn new ideas and share their experiences. One of the researchers plans to provide parent training sessions in the near future to support the use of iPads for education at home.

Support is ongoing at UCF, through several different avenues. The CED is assisting in adding more tools and ways for faculty to check out and use the iPads. The educational technology faculty currently has 10 iPads dedicated to individual program areas. The vice provost for information technologies and resources has provided support by proposing that students, who become future school leaders, have no restrictions on their training in using these devices; students are taught all functions and apps are added constantly and shared during class. In others words, "just in time" teaching and learning is taking place.

One of the researchers provided support at UCF by teaching several workshops for preservice and in-service educators. These workshops allowed not only the opportunity to spark the fire of creativity,

but also to bring a needed sense of practicality to teacher strategies. The activities and discussion allowed these future and current educators to think not just in terms of technological capacities, but also possibilities. In other words, what can these devices do, what can they do for me as an educator, and what can they do for my students? This fall UCF will support the local area schools by offering workshops on mobile technology integration.

In looking back on these projects, it is impressive to see just how far each of them has come in less than a year. In addition to enhancing the education of students from Pre-K through master's level, each of the projects provided faculty and students with the opportunity to use the most current mobile technology. The journey, however, had its challenges.

THE PROJECTS: MIDCOURSE CHALLENGES

As with any initiative, each was confronted with challenges that needed to be addressed. These challenges included start-up time, management responsibilities, security issues, participant accountability, and resistance to change. None of these came as a surprise, but each posed unique barriers to successful implementation.

START-UP TIME

Working through a university purchasing office involves a tremendous amount of paperwork and signatures. It took 4 months to receive the iPads purchased for the NSU Athletic Administration Project; and even longer to receive the covers. Most of this was the result of the lengthy approval processes. For BPA, time issues presented themselves differently; it was not the technology, but the teachers that took time and nurturing. The researchers provided two half-days of training over the course of 3 months and created an

iCommunity (i.e., a wiki solely for the BPA teachers to learn, share, and integrate). However, only about 10% of teachers are truly integrating the iPads into the curriculum (as opposed to having them on a table for students to use at their leisure) and fewer are exploring the iCommunity.

MANAGEMENT RESPONSIBILITIES

Management responsibilities were another area that posed challenges to all of the initiatives. At UCF, the information technology and facilities administrative team tries to micromanage the project's 50 iPads by locking them down; they want to be the sole managers of the devices, apps, and settings. Perhaps this is because the IT staff does not understand the iPad and the needed flexibility with this mobile device. The IT staff feels the iPad is difficult to manage and has concerns over security issues. In truth, these devices are not like a computer that presents various security issues due to viruses and software. The iPad, in fact, has fewer security issues than most any other technological device.

Within the BPA and NSU initiatives, there has been the opposite effect. Each teacher/faculty member manages and maintains their device. This however, resulted in the next barrier.

PARTICIPANT ACCOUNTABILITY

At BPA there is a lack of accountability that is minimizing the potential of the initiative. The principal, while supporting the initiative, had avoided setting minimum accountability standards for use. At NSU, the faculty teaching in the Athletic Administration program live all over the country, making accountability more challenging. Initially all faculty were eager to receive a "free" iPad; however, not all have been participating in each of the pilot study phases; and at least one faculty member has failed to participate at all.

Working with classroom students has helped UCF avoid the participant account-

ability issues facing the other two projects. Since grades are dependent on participation in class activities, students are held accountable.

RESISTANCE TO CHANGE

Finally, resistance to change (or perhaps fear of change) seems prevalent, even in a society where mobile technology is pervasive. The teachers at BPA are resistant to change, the IT team at UCF is resistant to let go, and the faculty at NSU are resistant to moving forward. These are challenges that must be overcome.

THE PROJECTS: MOVING FORWARD

While not all projects might have the opportunity to experience the early successes that supported the development and implementation of these pilot projects, it is worth noting that many universities and schools are anxious to adopt mobile technology in their classrooms. Moving these initiatives to the next phases of development, full implementation and data collection involves incorporating lessons learned from best practices. Some of these lessons guided the early phases of project development and some were learned during project implementation. For example, it is essential to "go slow to go fast." Before getting started, develop a plan, with flexibility, for integrating mobile technologies into the curriculum. Plan for extra time to order and receive the technology and plan for a slow rollout; choose one or two classrooms/programs for the initial pilot study.

Training and support are critical. Incorporate ample training time. The first training should consist of an introduction to the digital learner and the mobile device of choice. Suggest a few applications for teachers to get comfortable with their devices and allow them time to "play" with them. After allowing time to get familiar with the devices, offer a second

training on how to integrate the devices into the classroom. Provide tools for success such as having the teachers create a presentation using Keynote to "teach" their colleagues multiple ways to integrate a designated app. Develop and introduce an iCommunity for stakeholders to seek and share information. If you have the staff, assign a technology mentor to the teachers in the pilot study to assist them in integrating mobile devices. At the end of the pilot study, have a debriefing meeting with the teachers involved to learn what was most effective. Then, slowly begin expanding the initiative to other classrooms, grades, or programs using the original pilot teachers as mentors.

Administratively, one of the most important strategies is to determine how to be supportive and still hold participants accountable. Depending on the group and the time, some options might include having them present a lesson plan at a staff meeting, requiring them to integrate the devices a certain number of times each week in their class or across all content areas, asking them to share favorite apps and integration ideas on the iCommunity, or having them develop out-of-class content or videos for students to view on their own or with their parents. Even for administrators who generally trust teachers to move forward on their own, having an accountability plan is vital to the success of any initiative.

Engaging the digital learner is also important. The first step in engaging the digital learner is choosing appropriate applications. There are more than 1 million apps in the App Store and specifically, over 80,000 education and learning apps (Statista, 2013). There are many free apps out there to use and try out, but be wary of the in-app purchases in many of these "free" apps. For purchasing iOS apps and books in volume, consider The Apple Volume Purchase Program, which offers special pricing on purchases of 20 or more apps (Apple in Education, 2013). Test the

apps out fully before using them in class; one of the researchers used an app with the Pre-K class that made inappropriate noises when the children answered incorrectly (the app was tested prior to entering the class, but only correct answers were chosen during testing). App evaluation rubrics are becoming popular as a way to assess educational apps for their relevance and functionality (see http://learninginhand.com/blog/ways-to-evaluate-educational-apps.html or http://www.educatorstechnology.com/2012/11/a-must-have-app-evaluation-rubric-for.html for examples).

Another popular way to engage the digital learner is by designing curriculum that offers the opportunity for flipping the classroom and utilizing teacher created materials. In the flipped classroom, teachers provide out-of-class content (i.e., lectures or review materials) for students to watch or play at home and then use class time for working through examples and assisting struggling students. Teachers can create their own out-of-class content (e.g., using screen capture software such as educreations to create a video or tutorial) or use existing tutorials (see Khan Academy at khanacademy.org/ or search YouTube for great examples). Additionally, teaching the production elements of the iPad using iBook Author and iMovie are great ways to support curriculum design and implementation.

As these initiatives move forward, the barriers that impacted these projects must be addressed. Failure to plan for the constraints posed by start-up time, management responsibility, participant accountability, and resistance to change will result in disappointing results.

CONCLUSION

Mobile technologies are not going away. If teachers and administrators do not want to be left behind, learning and supporting the integration of mobile technologies into

their curriculum is essential. The possibilities presented by this technology are limitless. Each new demonstration of app or technique holds the potential to flip the "lifetime learner" switch within all of us. However, the investment in time and money for such initiatives can be extensive. Currently, the research supporting such an investment is limited. Future research needs to focus on providing empirical evidence showcasing the effectiveness of mobile technologies in education.

The researchers are currently working on three studies to provide empirical data: (a) a quasi-experimental design to determine whether iPads significantly improve Pre-K student achievement as measured by the Florida Voluntary Prekindergarten Assessment; (b) an exploratory case study on teachers' experiences integrating mobile devices at a community charter school; and (c) a concurrent, triangulation mixed methods design to determine how integrating digital devices into a master's program affects students' engagement, satisfaction, knowledge and skills, and time on task. Future research focusing on parental involvement is necessary so parents can learn how to use mobile devices to enhance children's learning at home (i.e., supplement what they learn in school).

The future, as is the way with technology, is bright and optimistically uncertain. As student enthusiasm, teacher ease of use and comfort with integrating, and administrative support increase, the use of mobile technologies like the iPad will transcend novelty into the strata of essential tools. As for advancement of these projects, focus will shift from building the plan to actually flying it.

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