

Vaughan, M., Beers, C., & Burnaford, G. (2015). The impact of iPads on teacher educator practice: A collaborative professional development initiative. *International Journal of Technology in Teaching and Learning*, 11(1), 21-34.

# The Impact of iPads on Teacher Educator Practice: A Collaborative Professional Development Initiative

Michelle Vaughan, Courtney Beers & Gail Burnaford  
*Florida Atlantic University*

This case study explored the impact and effectiveness of a teacher educator professional development initiative after 11 faculty members received iPads and committed to learning about their applications for teaching, research, and service. The six-month study featured interviews, a focus group, survey, and a collection of artifacts from faculty regarding their experience with the iPads during this period. Results indicated an appreciation for collaborative professional development and engagement with applications on the iPads that helped faculty organization and student feedback support. Results contributed to a researcher-designed continuum of impact and preferences for types of professional development based on individual technology experience. Based on criteria that emerged from the data, faculty appeared to be at Emergent, Progressing or Fluent levels of use; levels have implications for proposed future research and design of professional development for teacher education faculty.

Keywords: iPads, mobile learning, professional development, interviews, faculty preference

## INTRODUCTION

The culture of learning in higher education has changed as a result of advances in technology and easy access to an online learning environment. Students in American colleges and universities have already grown accustomed to using this technology, particularly mobile devices, as a means for gathering information. Some universities have addressed this trend by focusing funds and resources on the purchase of campus-wide devices for students, however, there is literature to suggest that universities may be concentrating their technology investment too heavily on tangible items instead of addressing the infrastructure barriers that may impact their actual implementation (Kagima & Hausafus, 2000). This may lead to the criticism that faculty often fail to adapt as quickly

---

*Michelle Vaughan is an Assistant Professor, Courtney Beers is a doctoral Candidate, and Gail Burnaford is a professor. They are all in the Department of Curriculum, Culture and Educational Inquiry at Florida Atlantic University. Michelle Vaughan can be reached at mvaugh3@fau.edu*

to these recent technology changes and are inadequately preparing students to meet the demands of the new digital age (Gesist, 2011).

Faculty in teacher preparation programs are aware of a gap between student learning styles and higher education instructional practices, but many have found it difficult to close this gap. Students, already digital natives, use mobile devices to complement their everyday academic pursuits. Faculty have often found themselves taking on the role of digital immigrants, attempting to engage students but lacking the knowledge needed to apply these rapidly evolving tools into pedagogical practices (Friel, Britten, Compton, Peak, Schoch, & VanTyle, 2009; Prensky, 2001). Using the term Net-Generation students, developed by Howe and Strauss (2000), Kyei-Blankson, Keengwe, and Blankson (2009) studied the discrepancy that exists between student expectations of faculty technology use and their perception of actual technology use finding that students consistently expected their professors to be more competent in their use of technology. Based on their work, they discuss the need for “campuses to design and implement a strong academic vision grounded on technology integration as well as offer relevant professional development programs that support teachers experimenting with new technologies” (p.211). This study hopes to add to the growing body of literature that can shed light on how to positively and successfully integrate new technologies into teacher education departments.

## **LITERATURE REVIEW**

### *MOBILE TABLETS IN HIGHER EDUCATION*

It has been suggested that mobile tablets will soon “revolutionize higher instruction,” (Miller, 2012, p. 54) generating student engagement and motivation and transforming the classroom experience. However, this revolution brings with it its own challenges. Students report that mobile devices can be misused in the classroom, as a result of instructor ignorance, and are therefore ineffective (Miller, 2012). In addition, Ng’ambi (2013) highlights the “dichotomy between the technologies supported and used in higher education institutions on one hand, and the technologies owned and predominantly in use among students” (p. 652). As college classrooms become populated with more mobile tablets, whether they are purchased by students or universities, it becomes necessary for educators to approach their instructional practice with an emphasis on integration, rather than the mere use of digital tools for personal or professional efficiency. This change will require the evolution of pedagogical practices (Idrus & Ismail, 2012). Not only are faculty asked to acquire the skills needed for using mobile learning devices, but also to learn the pedagogical and content knowledge that should accompany it. Harris, Mishra, and Koehler (2009) refer to this as technological pedagogical knowledge or “an understanding of how teaching and learning change when particular technologies are used” (p. 398). It would seem that effective faculty professional development would incorporate building technological skills for using mobile learning devices as well as instruction in pedagogical practices that appropriately integrates technology (Friel et al., 2009).

### *PROFESSIONAL DEVELOPMENT FOR TECHNOLOGY INTEGRATION*

A focus of this study was to examine the individual and contextual factors that impact the approach to learning to integrate innovative technologies such as mobile devices. Buchanan, Sainter, and Saunders (2013) identified two key barriers to the adoption of new technologies: structural constraints that may exist within the university and the perceived usefulness of the tool. This echoes the technology acceptance model (Davis, 1989), a widely used framework to understand the range of individual use of technology, which

suggests it is the perceived usefulness in addition to the perceived ease of use of a tool that predicts its acceptance. Over 15 years ago, Leggett and Persichitte (1998) identified five barriers that impact technology integration that continue to be supported by recent research. Time, expertise, access, resources and support for new learning can be identified both as individual and contextual factors that could potentially impact the integration of innovative technologies. The goal of this study was not to define a new model for technology integration or to test an existing model. Rather, building off of the literature surrounding change theory and professional development (Guskey, 2002; Hall & Hord, 2011), this case study sought to examine the ways in which faculty in a teacher education department wrestled with the voluntary integration of a mobile learning device, both in their personal and professional life as well as in their practice as an educator and scholar.

### **PURPOSE AND RESEARCH QUESTIONS**

The purpose of the study was to assess the impact of the iPad professional development program, specifically with respect to its effects on innovation among a selected group of teacher educators.

The study addressed the following research questions:

1. What individual factors influence teacher educators' approach to learning to integrate innovative technology?
2. What does innovative practice look like using iPads in teacher educator classrooms?
3. What are the contextual challenges that teacher educators face as they learn to integrate innovative technology?

### **METHOD**

#### *PARTICIPANTS*

Nine faculty members participated in this study. In the spring of 2013, a small department housed in a College of Education within a large public university initiated a faculty professional development project focused on using iPads for innovative instructional practices. After a vote to proceed, 11 departmental faculty members were awarded a new iPad, a Professional Development Log, and two hours of introduction from an Apple higher education representative familiar with the project goals. All agreed to participate in and document at least five hours of professional development. The required professional development could be independently completed or faculty members could participate in sessions organized by the department. Nine of the 11 faculty members agreed to participate in the case study research.

After launching the initiative, the project shifted due to the introduction of a new department chair who was supportive but was not present when the faculty voted to purchase iPads and share in the professional development. In addition, two senior faculty members declined to participate in the research and two new visiting faculty members were added to the department roster. These events are not unusual in higher education as work assignments, leadership, and priorities change. All were invited to choose from a menu of formats and structures for learning applications on their iPads in a supportive, collaborative environment in exchange for their sharing of the use of multiple tools for "teaching, research and learning" (Kukulska-Hulme, 2012, p. 253) with their peers. The Department Chair, two doctoral graduate assistants and other interested faculty contributed ideas for weekly "Thirty Minutes with..." sessions, where experts in specific applications or functions were brought in to teach faculty in a thirty-minute hands-on session. In addition, website tutorials and YouTube videos were also shared with faculty. As mentioned,

participants were encouraged to pursue their own forms of professional development that included online tutorials, Apple One-to-One sessions, and sessions with university instructional support personnel.

### *DESIGN AND PROCEDURES*

The design included 4 data sources: 1) an intensive initial interview with each faculty member; 2) artifact collection including Professional Development Logs, iPad Presentation materials, and/or Syllabi reflecting technology integration; 3) a Survey on collaborative processes at the midpoint of implementation; and 4) focus group of participating faculty at the end of the study.

Interviews were conducted at or near the beginning of the project and addressed each participant's prior experience with technology integration and specific experience with iPads. These interviews were intended to be "transformative" in that the researchers intended to challenge and stimulate greater understanding and critique of their pedagogical practices with respect to technology (Roulston, 2010, p. 220). The interviews had the potential to assist participants in "opening up to the talk" on the potential for technology integration using iPads (Roulston, p. 220). The 45 – 60 minute interviews were recorded, transcribed, and coded. Sixteen codes were developed through initial open coding (See Table 1) and researchers reexamined data in order to "reduce and combine them into themes" (Creswell, 2007, p. 152). Six themes were created from the original code list and these six themes were used to re-analyze the remaining surveys and focus group interviews. Frequency of codes was examined in order to assist researchers in identifying trends although it is important to note that "a count conveys that all codes should be given equal emphasis" (p.152) and in this analysis, the counting of codes was used to determine participant interest and assist researchers in collapsing codes into themes that would address the research questions.

The Survey, distributed through Survey Monkey, invited participants to report their prior and current familiarity and use of specific applications, tools, and learning management systems as well as their goals for the professional development (See *Appendix A* for Survey Protocol). The survey was developed following an informal sharing session of applications and technology currently used by faculty members. Fifteen shared applications and technology were recorded and listed in the survey for faculty members to select which applications they were most interested in learning more in future professional development. In addition, five open-response questions asked faculty members about their current definition of innovation in teaching, their responses to the professional development initiative, and how the technology used by their peers may influence their view of innovation. The last question asked faculty members to respond to a quote from the literature surrounding the discrepancy that may exist between the learning preferences of Net Geners and the traditional teaching practices employed in higher education.

The focus group, conducted near the end of the study, served as the means to clarify and expand on data derived from previous sources and centered on the educators' reflections on his/her own learning, including the contextual challenges that teacher educators face with technology integration. Focus groups are necessarily dependent on group interaction and self-reported data (Morgan, 1997); the focus group was important in this study due to the explicit collaborative nature of the professional development initiative. A group reflection was both appropriate and valuable; 5 of the 9 participating faculty participated in the focus group. The focus group was also recorded, transcribed and coded using the six themes listed in Table 1. Exit slips from formal and informal professional development sessions as well as Professional Development Logs and artifacts were

collected on a voluntary basis and content analysis using the codes above contributed to the results.

*Table 1.* Code List for Interviews/Focus Group, Including Number of Occurrences in Transcripts

Initial code list	Themes created from initial coding	Research Question
SDC – Student driven change (8) PPC – Pressure prompted change (2) TTT – Technology to teach teachers (4) QT – Questioning technology (7) DT – Dislike of technology (5) PK – Prior knowledge/experiences (7)	Influence of individual factors on use  Impact of prior knowledge on use	RQ 1
SPD – Small/informal professional development (8) IPD - Individual professional development (11)	Professional development preference	RQ 1
OL – Opportunity to learn/recognition of growth (9)	Collaborative opportunities for learning	RQ 1
EC – Examples of change (8) EU – Examples of use (26)	Attempts at change and use in practice	RQ 2
OB – Obstacles (16) MPD – Missed professional development(3) TC – Time Commitment (12) FC – Fear of change (3) UT – Uncomfortable with technology (6)	Contextual challenges to integrating technology	RQ 3

## RESULTS

*Research question 1: What individual factors influence teacher educators' approach to learning to integrate innovative technology?*

The individual factors that influence both the approach and attitude regarding technology integration contributed to the development of a continuum of users (See Figure 1) that may be helpful in designing professional development for higher education professors in the future.



*Figure 1.* Continuum of individual factors that influence technology integration among teacher educators.

Data analysis of interviews and the focus group revealed three general categories of users: Emergent, Progressing, and Fluent. The three categories are not self-contained and remained fluid throughout the study as users learned and relearned, were introduced to new applications, and discovered new approaches to their teaching, research and service. The

goal of this study was not to create categories of technology use or test the various levels of use that currently exist in the literature (Hall & Hord, 2011; Rogers 1995). However, analysis of the data revealed that faculty perceptions, beliefs, and prior use often impacted their iPad integration. To assist in the discussion of results, criteria were developed that best characterize the varying degrees of users in this particular study. Criteria to situate faculty members' individual prior and current experiences and predispositions toward technology that emerged from this case study may be useful in future research (See Table 2).

*Table 2. Criteria for Continuum of Individual Factors among Teacher Educators*

<b>Emergent User Criteria</b>	<b>Fluent User Criteria</b>
Externally motivated	Self-propelled motivated
Content-centered/delivery model	Student-centered
Organizationally focused	Pedagogically focused
Little or no prior experience with technology	Experience with technology
Caution	Higher tolerance for risk
Little self-interest	Self/personal interest

Emergent users' initial unfamiliarity with the basic technical skills produced frustration and unintentionally inhibited the collaborative nature of this initiative. A faculty member discussed this: "I have been so stressed out that it seemed like another thing I had to do, but I wanted to be part of the department and not be a spoil sport or something. So, I just said fine, great, whatever." Exit slips from professional development sessions revealed that Emergent users did not realize that they could check email or get eBooks online on a tablet, suggesting the need for a level of support that was not offered in the initial training. They had difficulty with passwords and immediately wondered about limitations of the tool and printing capability, suggesting a need to situate this new technology within the familiar systems and tools professors already used. Emergent users were highly content-centered in their pedagogical approach to teaching that was not dependent on technology apart from email communications with students.

The Progressing faculty members had eLearning training and were proficient in using the Blackboard Learning Management System (LMS). They considered themselves competent and knowledgeable and had taught a number of online classes. They had not, however, explicitly expanded their pedagogical teaching repertoire to include tablets or the social networking capabilities of mobile tools. Exit Slips and Professional Development Logs from this group revealed their need for immediate application and examples for application in teaching courses that they had been teaching successfully without mobile tools and tablets. Initial interviews revealed that they did not necessarily see the relationship between technology integration and innovative teaching, student engagement or student-centered classrooms. The Blackboard LMS was a management and organizational system for content delivery largely controlled by the professor. One professor wondered about whether it was feasible to use tablets if their students did not have them too. Progressing users expressed considerable caution, particularly in the focus group where they had the opportunity to expand upon their own uses and obstacles with integration. For the Progressing teacher educator, the iPad initiative challenged and at times overwhelmed with new potential, new tools for student communication and new approaches to research.

There were distinct differences between the Progressing users and the Fluent users with respect to their willingness to integrate iPad applications into their technological menus in existing coursework. In interviews, Fluent users seemed to suggest an understanding that in order to improve technology use in higher education classrooms, professors needed to shift control from a teacher-centered to a student-centered environment (Blackwell and Yost, 2013, p. 325). These teacher educators recognized that their actual approaches to teaching, including classroom interaction, nature of assignments and feedback on student work as well as assessments are affected when technology is integrated in course work. Fluent users were not necessarily more adept with the technology; rather, they exhibited a willingness to take risks and experiment with changes in their practice. With Fluent users, growth in technology proficiency seemed to be prompted by several motives. Exit Slips and Professional Development Logs from this group reflected their learning of specific tools and how they intended to use them:

I learned about Corkulous and Simple Minds – both mind maps apps as well as iBook Author that I will be using with my students in my courses.

Went home and did a sound and highlighted article using iAnnotate. Now if I can figure out how to export the document and keep the sound clips!

Screen capture, Jing – and I'm using it all the time now – the best thing I've learned so far.

Fluent users, even if they were new to iPads, expressed their recognition of the role that hand held and mobile devices already played in students' lives. In interviews, these faculty members noted the need for higher education classrooms to stay current and utilize means of communicating and providing feedback to students that were consistent with what students were experiencing elsewhere in their daily lives. They also affirmed their own self-interest in learning the technology for their work and the desire to keep informed about the capabilities on new technology. One of the faculty members described her intrinsic motivation for pushing forward with technology despite challenges.

I think it's a habit of mind, as Costa would say. To understand that you are going to get stuck and you have to learn to play...so I've developed a sort of consciousness about how to play with this sort of stuff and be okay with it and say "I don't know how to do this" and not feel like I'm going to be stupid in front of you or other young people who are ahead.

Another Fluent user explained that she is motivated by the needs of her students: "I've tried to [integrate] myself, but it's really more about how does it help me teach and also give teachers ideas how to teach (subject area) learners." These comments illustrate the link between attitude and learning in this iPad initiative. Even the Fluent users, however, did not yet fully understand how to integrate iPads into teaching. The term "Fluent user" in this case study represents their consistent stance on professional development and learning, not necessarily their expertise using the new technologies.

*Research question 2: What does innovative practice look like using iPads in teacher educator classrooms?*

After six months with iPads, professors identified specific uses for the tablet and applications, indicating the impact of the professional development initiative in terms of

greater familiarity with the potential for tablet use. Professors specifically reported using the iPad for

- audio recording
- conference documentation
- documentation in general (e.g., photos)
- eBooks and eReaders
- observations in classrooms (e.g., portable note-taking)
- organization
- presentations
- research

Those uses did not necessarily reflect direct integration of iPads in face-to-face classroom teaching. In a department sharing session, faculty members shared the technology on the iPad that most excited them. In the session, faculty members shared Apps that would help make their research more efficient (e.g., recording tools and annotation apps), address the needs of their own children (e.g., writing, reading and drawing apps) and help them learn a second language. One App for accessing Blackboard Collaborate (i.e., the learning management system used by this university) was shared. Following the session, the participants reported a high level of interest in the Apps that would assist them in their own research and student feedback as well as provide students with access to Blackboard Collaborate. Table 3 reveals which iPad Applications were identified as useful and worth learning more about after they were shared.

*Table 3. Faculty Interest in Applications during Professional Development Initiative*

Application	Number of Faculty Members Who Expressed Further Interest
Blackboard Collaborate	3
Blackboard Mobile	0
Bob Books	2
Camera	1
CamScanner	1
Cloud	1
Common Core Standards	0
Duolingo	2
EduCreations	0
Evernote	0
iAnnotate	2
iTunesU	0
Keyboard Languages	2
Keynote	0
Kindle	0
LiveBinder	0
Notability	6
Notepad	1
Office HD	1
Prezi	0
Show Me	2
Storytime	1
Voice Record Pro	7
Write This	0
YouTube	0



There was genuine interest in how the iPad could best function as a teaching tool, although Table 3 shows the highest level of interest were for Voice Record Pro and Notability, two applications that were demonstrated to assist with scholarly research. Faculty members seem to have mixed views of what this technology would look like in the classroom, and it sparked rich conversation in the department. Two faculty members discussed this idea with contrasting views:

I quite frankly haven't figured out how to integrate this into my classroom. I have problems with – as I said before, it's [the iPad] not really robust enough to do what I do. It's limited for me...that's my challenge...to figure out how to use it in my classroom...so I use it to collaborate with my students in that way, but not during instruction.

And a second faculty member replied:

It's still instruction. You know, we think of instruction as this narrow space, where we have to have this physical thing in the classroom in order to have it be used for instruction. But if it's used to plan for instruction or respond to students, give feedback or to record something, it's still part of instruction.

Today's teacher educators face the challenge of gaining and retaining the attention of a new generation of learners who expect the implementation of innovative practices into classroom pedagogy. However, faculty members struggle to define how such practices should look and what they need to know in order to be competent with students, as this professor explains:

I think our students are going to be using Apple technology in the classroom that I don't know how to use and I don't know how to guide them and I don't know what programs are available. So, I've used it more in terms of knowing enough about it so that I can incorporate it into explanations and information for them.

Progressing and Fluent users described their use of the iPad in terms of easy access to applications, including learning management systems (e.g., Blackboard), videos (e.g., YouTube), and presentation tools (e.g., PowerPoint and/or Prezi). They cited the iPad as a tool for organization, note taking, documentation, and feedback. More fluent iPad users were likely to use the tablet to increase their efficiency in terms of faculty scholarship, including research, service, and teaching. In addition, the iPad served as another classroom resource for accessing material on the Internet. One faculty member captured this when she stated, "Exploring these ideas (the use of iPads) naturally spills into my teaching. It integrates the idea of instant information into best practices." The iPad further expanded the notion of innovative pedagogy as it led to other notions of technology integration within the classroom, encouraging faculty to consider broader areas of practice such as flipped classrooms and eLearning. Still, examples of how these teacher educators actually transformed their curricular coursework were not yet evident as participants learned the applications during this initial professional development period.

All the professors in the study, regardless of proficiency or amount of time spent learning about the tablet technology, recognized that good teaching was the goal, not the mastery of an application, as one participant expressed in the survey when asked what she hoped to learn from the project: "The mechanics of an app, the connection to good teaching (or not), and examples from others about how they have used technology are part of good teaching - not in place of it".

*Research question 3: What are the contextual challenges that teacher educators face as they learn to integrate innovative technology?*

Regardless of their level of comfort with technology, all participants in this study faced contextual challenges in integrating innovative technology practices into their classrooms. Faculty most often cited time as a major obstacle; however, the concept of time was differentially applied. In fact, perceptions of time correlated to knowledge of technology. For example, Emergent users felt that the iPad was more a burden on their time. In fact, one faculty member was troubled by the 24-hour access to the Internet and stated, “The iPad blurs the space between work and home and it is almost an intrusion on mind time that I want for critical thinking.” Integration of technology into the classroom or even online learning was also perceived as a hindrance: “I have to go through the IT department because my courses are so heavy. I would say that’s a challenge. I have 4 courses a semester. I can’t recreate. It’s time-consuming.”

Respondents to the survey expressed concerns about the time needed to incorporate iPads as well as the “learning curve” that most had. More experienced users desired additional time in order to digest the wealth of possibilities that the iPad might offer. Lack of time was also mentioned in regard to the iPad professional development where faculty members’ busy schedules interfered with both collaboration and “play” time.

A few faculty members also questioned the practicality of the iPad, expressing frustration at its lack of useful memory space and the incompatibility among programs. Two participants commented that the iPad did not offer anything particularly useful when compared to other forms of technology. As one faculty member asserted, “I struggle to find a place for the iPad between a laptop on one hand and a smartphone on the other.” Several disagreed, stating that the iPad provided versatility, including the diversity of the applications and easy navigation of the touch screen.

Faculty members in the focus group agreed that the iPad was not an all in one solution, but as one faculty member added, “The thing to understand is the difference between the tablet and the computer. It can’t do what a computer can do and it’s not supposed to.” With a limited number of examples for the use of the iPad in the classroom, some faculty felt frustrated with the mixed messages they received. They were told that this tool would redefine education; however, there was a lack of information on how that would take place.

In addition to faculty’s perceptions of lack of iPad application knowledge, some also cited the challenge of varying ability levels among their students. Teaching to these different levels of knowledge results in additional class time spent in technology instruction instead of other content mandated for teacher education programs. As one faculty member asserted, “Every time I try to get them to use the technology that they don’t know, as a group or as individuals, I have to ask myself, am I teaching a technology course or am I teaching a (content area) course?” Not all students come to class as fluent users. A few of the faculty members from this study felt that they did not have the time nor knowledge to educate their students in such areas, and therefore, they just did not integrate at all.

Others expressed concern for being able to anticipate the technology needs of teacher candidates in their field placements, student teaching, and future careers:

The technology that they need to do in my class is one thing; the technology that they need for high school is another; the technology for (content area) is another - how am I going to give them an appropriate (content area) background and appropriately integrate technology into that... that’s a whole different course. They do need that course - taught by someone who has those skills.

In wrestling with these varied skill levels, faculty noted that they either overload their courses with both content and technology material or they spent less time on their designated content areas. Neither of these choices is ideal. Instructors find that it weighs heavily on their time to differentiate both content and technology course work, and they independently lack the time and/or the knowledge to offer such assistance.

## **DISCUSSION**

### *TECHNOLOGY INTEGRATION PROFESSIONAL DEVELOPMENT FOR TEACHER EDUCATORS*

The literature suggests that technological experience can create both confidence and positive attitudes toward technology (Hardy, 1999; Levine & Donitsa-Schmidt, 1998; Liaw, Hatala, & Huang, 2010). This case study validates this notion; those teacher educators who questioned the versatility of the iPad the most were also those who had the least experience using it. Therefore, it is possible that additional professional development that incorporates technology with multiple and rich examples of classroom practices could help to boost both confidence and positive attitudes.

Faculty members in this study appeared to be clustered loosely on a continuum according to proficiency of both prior and current technology use. All Progressing and Fluent users reported using technology and more Fluent users reported exploring the use of an iPad to build a more student-centered classroom.

### *AGE AND EXPERIENCE AS FACTORS IN TECHNOLOGY LEARNING*

Broadly, Chan, and Caputi (2008) conducted a study in which they compared older and younger adults' attitudes toward and abilities with computers. They discuss research suggesting that anxiety about computers is correlated with negative attitudes toward using computers. Some have also suggested that computer-related anxiety is related to age (Laguna & Babcock, 1997; Czaja & Sharit, 1998, as cited in Broadly, Chan, & Caputi, 2008, p. 4). Studies exploring this phenomenon have often focused on the elderly, those aged 60 years or more. Four of 10 faculty members in the present study were in their sixties. Broadly et al. (2008) suggest that older people, because they did not and do not necessarily see technology as part of their way of life, need to be shown the benefits of using technology more explicitly than younger users do. "Opportunities for concrete experiences capable of generating a personal conviction that a given technology is worth using and an understanding of the context in which it is best used" (Kukulska-Hulme, 2012, p. 247).

Furthermore, as people age, Baltes (1987) suggests that they cope with adding information and changing environments by being more selective about what range of options they will allow into their personal and professional routines. There is evidence that older people are beginning to realize the permanence of technology in the modern world and that they should not avoid that fact and be left behind (as cited in Broadly et al., 2008, p. 4). Young people show a more uniformly positive perspective regarding computers and their usefulness professionally and personally (Broadly et al., p. 7). In fact, there was the perception among some faculty members that they have spent too many years practicing in silos and, as a result, their teaching skills fail to change. As one faculty member in this case study commented, "If we get new blood, but also technologically savvy new blood, then I think that by osmosis we will begin to learn. I know I do. I learn by being around people who do things differently than I do." This case study suggests the value of offering fewer

options and encouraging older faculty members to be selective in order not to feel overwhelmed by the potential for technology in their professional lives.

Perhaps equally important is the number of years of teaching as a factor among university professors. This particular group of faculty reported between 10 and 25 years of teaching at the university level with none below the 10-year level of experience. Some researchers have suggested that baby boomer teacher educators have failed to create opportunities for students to use technology skills and this practice “prevents teacher educators from co-learning with their students” (Blackwell and Yost, 2013, p. 325). One of the most effective strategies for professional development may be to construct experiences with students, not apart from them, so that all can become co-learners.

Researcher Meredith Farkas (2012) proposes the consideration of what she has termed Pedagogy 2.0 when using participatory technologies in the classroom. She asserts that higher education is still dependent on learning platforms that are not reflective of how people learn in the 21<sup>st</sup> century. Instead, she suggests drawing upon a framework of participatory pedagogy in which students, through the use of portable and flexible technology tools, have more choices with respect to technologies and learning activities as well as ownership over learning through the use of constructs such as student-directed blogs, wikis and social media sites. Examples of such innovations are necessary in the professional development of faculty at the higher education level.

## CONCLUSION

Finally, if there are not clear college and departmental policies as well as support systems for the future use of technology, critical dialogues, such as those that took place during this six-month initiative, could easily cease. There is a need for senior faculty and administrators to be explicitly supportive of faculty development; even though the mission in higher education is necessarily focused on students, there is a need to also focus on the needs of faculty in order to achieve that mission (Kukulaska-Hulme, 2012).

The role of tablet use in teacher education more generally has yet to be determined, but the need for faculty members to integrate innovative technology into their teaching is clear. This case study supports a collaborative, individualized and options-based model for faculty learning in higher education. The study also indicated that technological knowledge can grow in a short time period for all levels of technology users along a continuum, especially if strategies are applied with respect to previous experience and a variety of options for learning. With support from administration, this initiative will continue to foster discussions among faculty as they work towards their own definitions of pedagogical innovation in student-centered learning environments.

## REFERENCES

- Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23(5), 611-626. doi:10.1037/0012-1649.23.5.611
- Blackwell, J., & Yost, N. (2013). Teacher education programs and technology: Preparing teacher candidates for working with P-8 students. *Childhood Education* 89(5), 325–328. doi:10.1080/00094056.2013.830918
- Buchanan, T., Sainter, P., & Saunders, G. (2013). Factors affecting faculty use of learning technologies: Implications for models of technology adoption. *Journal of Computers in Higher Education*, 25(1), 1-11. doi:10.1007/s12528-013-9066-6
- Broadly, T., Chan, A., & Caputi, P. (2008). Comparison of older and younger adults' attitudes towards and abilities with computers: Implications for training and learning.

- British Journal of Educational Technology*, 41(3), 473-485. doi:10.1111/j.1467-8535.2008.00914.x
- Creswell, J.W. (2007). *Qualitative Inquiry & Research Design* (2nd ed.). Thousand Oaks, CA: Sage.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 13(3), 319–340. doi:10.2307/249008
- Farkas, M. (2012). Participatory technologies, pedagogy 2.0 and information literacy. *Library Hi Tech* 30(1), 82-94. doi:10.1108/07378831211213229
- Friel, T., Britten, J., Compton, B., Peak, A., Schoch, K., & VanTyle, W. K. (2009). Using pedagogical dialogue as a vehicle to encourage faculty technology use. *Computers & Education*, 53(2), 300-307. doi:10.1016/j.compedu.2009.02.002
- Gesist, E. (2011). The game changer: Using ipads in college teacher education classes. *College Student Journal*, 45(4), 758-768.
- Guskey, T. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, 8 (3), 381-391. doi:10.1080/135406002100000512
- Hall, G. E., & Hord, S. M. (2011). *Implementing change: Patterns, principles, and Potholes* (3rd ed.). Boston: Allyn and Bacon.
- Hardy, J. V. (1999). Teacher attitudes toward and knowledge of computer technology. *Computers in the Schools*, 14(3-4), 119-136. doi:10.1300/ J025v14n03\_11
- Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, 41(4), 393-416. doi:10/1080/15391523.2009.10782536
- Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation*. New York, NY: Vintage Books.
- Idrus, R. M., & Ismail, I. (2010). Role of institutions of higher learning towards a knowledge-based community utilising mobile devices. *Procedia - Social and Behavioral Sciences*, 2(2), 2766-2770. doi:10.1016/j.sbspro.2010.03.412
- Kagima, L. K., & Hausafus, C. O. (2000). Integration of electronic communication in higher education: Contributions of faculty computer self-efficacy. *The Internet and Higher Education*, 2(4), 221-235. doi:10.1016/S1096-7516(00)00027-0
- Kukulska-Hulme, A. (2012). How should the higher education workforce adapt to advancements in technology for teaching and learning? *Internet and Higher Education*, 15(4), 247-254. doi:10.1016/j.iheduc.2011.12.002
- Kyei-Blankson, L., Keengwe, J., & Blankson, J. (2009). Faculty use and integration of technology in higher education. *AACE Journal*, 17(3), 199-213.
- Laguna, K., & Babcock, R. L. (1997). Computer anxiety in young and older adults: Implications for human-computer interactions in older populations. *Computers in Human Behavior*, 13(3), 317-326. doi:10.1016/S0747-5632(97)00012-5
- Leggett, W. P., & Persichitte, K. A. (1998). Blood, sweat, and TEARS: 50 years of technology implementation obstacles. *Tech Trends*, 43(3), 33–36. doi:10.1007/BF02824053
- Levine, T., & Donitsa-Schmidt, S. (1998). Computer use, confidence, attitudes, and knowledge: A causal analysis. *Computers in Human Behavior*, 14(1), 125-146. doi:10.1016/S0747-5632(97)00036-8
- Liaw, S., Hatala, M., & Huang, H. (2010). Investigating acceptance toward mobile learning to assist individual knowledge management: Based on activity theory approach. *Computers & Education*, 54(2), 446-454. doi:10.1016/j.compedu.2009.08.029
- Miller, W. (2012). iTeaching and learning: Collegiate instruction incorporating mobile tablets. *Library Technology Reports*, 48(8), 54-59.

- Morgan, D. L. (1997). *Focus groups as qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.
- Ng'ambi, D. (2013). Effective and ineffective uses of emerging technologies: Towards a transformative pedagogical model. *British Journal of Educational Technology*, 44(4), 652-661. doi:10.1111/bjet.12053
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6.
- Rogers, E. M. (1995). *Diffusion of Innovations* (4th ed.). The Free Press: New York, NY.
- Roulston, K. (2010). Quality interviewing. *Qualitative Research*, 10(2), 199-228.
- Tapscott, D. (2008). Net geners come of age. *Businessweek online*. Pp. 25-25

## APPENDIX

### Online Faculty Survey

1. Please type your first name below.
2. Please choose the 3 pieces of technology shared at the faculty retreat that you were most interested in.
  - Blackboard Collaborate
  - Notepad
  - Show Me
  - Duoling
  - Flipped Classrooms
  - Notability
  - Bob Books
  - Write About
  - Story Time
  - iAnnotate
  - Keyboard languages
  - Syncing Calendars
  - Cloud storage possibilities
  - iPad and Office HD
  - Voice Record Pro
3. What were your impressions of the sharing session concerning our iPad Initiative at the retreat?
4. Following the sharing session concerning our iPad Initiative at the retreat, what do you want to know more about?
5. Now that you have heard what your peers are doing with technology, what seems innovative to you?
6. How can iPads be innovative in your teaching?
7. How has the collaborative learning in the iPad Initiative worked for you?
8. "The individual learning model is foreign territory for most Net Geners, who have grown up collaborating, sharing and creating together online" (Tapscott, 2008). What do you think?