Recommendations for Professional Development Necessary for iPad Integration

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Abstract
With the recent adoptions of 1:1 technology initiatives, such as the iPads in schools, it is urgent to provide appropriate professional development opportunities for teachers to maximize student use of the technology. This study provides vital information on the professional development needs of teachers for initial implementation of technology with the iPad device and what is needed beyond the first year to sustain use in classrooms. One hundred and ninety-one teachers from 10 school districts participated in the study. The results of this study indicate that successful professional development occurs when teachers are allowed time to collaborate with colleagues and learn from peers on how they integrated curriculum with the technology. Collaboration with peers and work time was more important to teachers than one-on-one coaching or large group professional development. Teachers also voiced a need for ongoing, differentiated professional development due to the wide range of teacher expertise and learning levels with technology.

Keywords: professional development, 1:1, iPad, integration, implementation, 21st century skills
Classroom instruction in a 1:1 environment with technology has increased in schools since the initial iPad launch in 2010. To support teachers use of technology for instruction, some schools use professional development time to train teachers on how to use the device and how to integrate the technology into their curriculum. Initial training on the device, learning management systems, and content-specific apps are common during initial adoption as teachers implement the device for the first year, but little research has identified specific professional development activities or topics that teachers feel are needed to sustain the technology use in the classroom. For teachers to use technology to increase student achievement and prepare students with 21st century skills, teachers need to be provided with specific professional development not only to initially implement the technology use, but also to sustain the use on a daily basis as the technology evolves. Research on technology adoption and integration clearly states that if school districts fail to recognize and plan for regular, relevant, and ongoing professional development, they are not likely to see widespread use or benefit to most students (Topper & Lancaster, 2013). In addition, specific professional development activities or topics to support classroom instruction with an iPad or similar tablet technology have not been identified. Teachers have identified that they long for professional development to take them to a higher level, the need for more professional development, and more time prep with the technology (Chou, Block, & Jesness, 2012; Pogany, 2009). Learning from teachers who have been using the technology in a 1:1 environment provides a foundation for identifying professional development needs for technology integration.
Literature Review

Reform in education has called for increased use of technology in schools to increase student achievement and technology skills. Technology integration, in which the students are the primary user of technology, results in increased student understanding, engagement, and critical thinking (Sheehan & Nillas, 2010). According to Lei (2010), the quantity of technology use has no impact on student achievement, but high-quality technological usage is beneficial to students academically. With the increase of technology in the classroom, the skills that teachers now need to develop and deliver curriculum and instruction has changed. It is critical for teachers to learn how to use the modern day technology to deliver instruction on a daily basis.

Previous barriers of limited technology resources have now been reduced as many schools in the United States are moving to 1:1 learning environments (Bebell & O’Dwyer, 2004; Bouterse, Corn, & Halstead, 2009; Inan & Lowther, 2010b; Spires et al., 2012). Failure to use technology effectively can result in a digital disconnect for students and limit the effectiveness of 1:1 initiatives (Dornisch, 2013; Levin & Arafeh, 2002). Some researchers report the overall impact of 1:1 initiatives on student achievement over the last decade is still unclear (Abell, 2008; McLester, 2011; Storz & Hoffman, 2012). Other research groups have documented increased student achievement when technology is integrated successfully in the classroom and the technology can improve student learning and engagement in lessons using technology (Bebell & Kay, 2010; Cheung & Slavein, 2011; Judson, 2010; Shin, Sutherland, Norris, & Soloway, 2011).

As schools continue to acquire more technology, the benefit to students will depend on the teacher’s technological skills and uses in the classroom. Many teachers are still uncomfortable in blending traditional pedagogies with those required to teach in a 1:1 environment (Donovan, 2007). Storz and Hoffman (2012) reported that before and after
implementation of a 1:1 initiative teachers reported feeling unprepared, frustrated, and out of their comfort zone and the shift of teaching practices has not dramatically changed (Storz & Hoffman, 2012).

**Technology Integration**

Many different definitions for technology integration in education exist in research. Various research groups have attempted to define technology integration into steps or phases for an educator and the skills that are performed (Cuban, Kirkpatrick, & Peck, 2001; Mills & Tincher, 2003; Sandholtz, Ringstaff & Dwyer, 1997). Most recently, schools have used SAMR (Substitution, Augmentation, Modification, and Redefinition) as a framework to evaluate technology integration (PuenteDura, 2013). While technology integration lacks a common definition, the common idea of using computing devices (tablets, laptops or PCs) for instructional purposes is consistently referred to as integration. Some teachers use technology primarily to deliver instruction (Bauer, 2002; Moersch, 1995), however, this would be considered technology use and is different than technology integration. For teachers to use technology as a tool for learning, it incorporates pedagogical principles of active learning, mediation, collaboration, interactivity, and is used to augment or improve instruction (Gorder, 2008; Kulik, 2003; Ross, Hogaboam-Gray & Hannay, 2001). Basic levels of technology integration would be using technology as a substitute for a common classroom practice such as research or writing a paper. In higher-level technology integration, students are using technology to collaborate with someone outside the school or creating an interactive presentation with video or audio that the student has created. Teachers must have the basic knowledge of technology in order to decide when or how to use integrate technology with the students. In order to effectively use technology, teachers must also have the knowledge and skills to integrate technology beyond
substitution and augmentation of existing curriculum. The idea of technology integration is for the learning environment to be more student-centered, transitioning to where the learning activities that are occurring would not have been possible without the use of the technology. Technology integration takes place at different levels depending on the teacher and the situation, and should not be measured by the amount of time technology is used (Earle, 2002). According to previous studies, several factors can lead to effective technology integration: access to technology and support (Hohlfeld, Ritzhaupt, Barron & Kemker, 2008); teachers’ beliefs and attitudes (Becker, 2000; Chen, 2008; Jimoyiannisa & Komisb, 2007; Lim & Chai, 2008; Van Braak, Tondeur, & Valcke, 2004; Vannatta & Fordham, 2004; Wozney, Venkatesh, & Abrami, 2006); pedagogical, content, and technological knowledge (Koelher & Mishra, 2006; Pierson, 2001); demographic characteristics of teachers, such as years of teaching (Bebell, Russell, & O’Dwyer, 2004; Van Braak, 2001); and ongoing professional development (Becker, 2000); and teaching models or mentors (Bitner & Bitner, 2002).

Despite the barriers, technology integration will continue to be a theme in schools as the rate of placing devices in students’ hands in a 1:1 environment increases. Therefore, continued research in this area to best support teaching will be ongoing. Successful integration into a class ultimately will depend on the teacher regardless of what type of computing device. Common movements in 1:1 adoptions today include laptop or tablet device. Declining cost, increased availability of wireless Internet, curriculum resources from textbook companies that are Internet based, student accommodation features for special education, durability, size, and portability are many of the reasons schools are adopting 1:1 technology. Also, many educational content-specific applications or apps have been developed for classroom use. Apps are self-contained programs or software designed for mobile technology.
Generally, 1:1 programs are designed to increase academic achievement, increase student engagement, transform the learning environment, increase equity, and increase student’s skills to compete in the 21st century (Abell, 2008). In a 1:1 teaching environment, teachers use computer devices to meet both the professional needs of the teacher and to support the needs of students. Technology in schools can help student learning, prepare students for the future, increase quality of instruction and increase student engagement (Abell, 2008; Hew & Brush, 2006; Lowther, Inan, Strahl & Ross, 2008). One-to-one initiatives vary on the amount or level of use in each classroom where some teachers use it on a daily basis using multiple apps where other teachers use it occasionally as they see fit into their curriculum. The challenge teachers face today is redesigning lessons for the 1:1 environment, where it is not just a tool in the classroom but the teaching and learning for students is different from the past. To truly change the nature of teaching in a 1:1 environment, it takes a significant transformation in how teachers teach (Pogany, 2009). Research on professional development to understand how to change teacher instruction using 1:1 technology is needed. Research related specifically to the iPad could benefit a larger number of schools. According to Tim Cook, CEO of Apple, iPads make up 94% of the market share for educational tablets (Cheng, 2013). It is recognized that technology will continue to evolve, and research in this area provides a base knowledge that could apply to later technologies.

While most teachers believe that technology will benefit students, many of today’s educators fail to integrate technology into their curriculum or integrate it in a meaningful way. Based on a study of classroom teachers’ experiences, the primary motivation for teachers to use technology is the belief that the technology will improve them as a professional and it will positively impact student learning (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010).
Confusion exists in teacher practices in part due to an unclear definition of technology integration. Technology integration is not just simple technology use for grading or looking up resources. Technology integration is teachers using technology on a daily basis within lessons (Gorder, 2008). For example, technology integration could mean collaboration with students in different schools in real-time to write a story or perhaps narrating a story by capturing an audio clip and embedding it in the document. With the increased access to technology devices for both teachers and students and availability of 1:1 Internet access, teaching with technology and technology integration is more than a substitution of what was done in the past. Technology integration in today’s classrooms should be redefining learning activities in ways that could not have been done in the past. Integration is still limited in teacher practice. The problem of technology integration is not new (Al-Bataneh, Anderson, Toledo & Wellinksi, 2008).

Increased availability of technology devices in schools does not necessarily lead to improvement in teaching practices (Inan & Lowther, 2010). Some barriers that have been identified include fear, time, hardware, training, support, climate, technology skills, teaching experience, age, beliefs, and professional development (Hew & Brush, 2007; Inan & Lowther, 2010). Studies have been conducted to identify what factors predict if teachers will integrate technology, but the results have been conflicting. Teachers’ beliefs and readiness, along with support and professional development, were reported by Inan & Lowther (2010a) as key factors as to whether a teacher would integrate technology. However, Males (2011) reported that teacher beliefs, attitudes and amount of time at a school were not the main reasons a teacher decides to integrate technology. Educators engaging in professional learning programs that are focused on instructional technology have been found to increase the level of technology use in the classroom, increase student achievement, and alter their beliefs in educational technology.
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(Carter, 2008). Schools do provide educators with various levels of professional development, but effective integration is not happening (Bauer & Kenton, 2005). Therefore, identification of professional development that teachers perceive as beneficial is important as more and more schools convert to a 1:1 environment with technology.

**Professional Development**

Professional development related to technology integration is now of importance to schools as teachers must change how they teach. Professional development is a cornerstone in professional growth (Carter, 2008). Professional development has taken on various forms over the last 40 years due to research in the field and the spread of information with technology. Strategies for professional development include workshops, expert training, learning communities, job embedded learning, and shared decision-making (Carter, 2008). Not all strategies of professional development work equally well and success may depend on the goal or focus. Professional development efforts that fail tend to be those where the activities are irrelevant to teacher classroom practice or one-shot approaches with little follow-up. Effective professional development is organized around real teacher practice, provides teachers with the opportunity to work and learn together, and brings together teachers who are engaged in similar efforts (Mouza, 2002). In addition, high quality professional development should focus on training teachers to improve student learning and achievement (Carter, 2008).

Teachers no longer have the option to not use technology when they teach if technology is available. Teachers who have been teaching for many years may not have been trained with the same level of technology skills as those who are currently graduating from teacher preparation programs, since most teacher preparation programs infuse technology to varying degrees. Regardless, instructional strategies designed in the past are no longer appropriate in
today’s classroom and teachers must be more advanced technology users and implement new teaching strategies (Brooks-Young, 2005). The International Society for Technology in Education (ISTE) established standards for both teachers and students in 2008 to encourage teachers to focus on 21st century skills and to use technology to learn and explore and not simply just employ technology. Teaching strategies must prepare students with digital age skills. The current standards are focused on higher-order thinking skills and digital citizenship. The standards encourage teachers to help students: (1) demonstrate creativity and innovation; (2) communicate and collaborate; (3) conduct research and use information; (4) think critically, solve problems, and make decisions; and (5) use technology effectively and productively (ISTE, 2008). In order for teachers to adopt new technology standards, professional development must be offered to aid in alignment with these new strategies to effectively incorporate technology.

Frequent professional development that focuses on technology integration is needed for teachers to move from a level of uncertainty to familiarity (Al-Bataineh et al., 2008; Lawless & Pellegrino, 2007; Sugar & Kester, 2007). An expansive literature review conducted by Lawless and Pellegrino (2007) on professional development related to technology found that the best professional development programs are spread out over time with opportunities for follow-up and feedback; and fragmented professional development of one hour or one day does not meet the pedagogical needs of teachers. A realistic technology integration plan should span two-to-five years to get a return for the investment and should include clear expectations, mentoring and practice (Hinson, Laprarie, & Cundiff, 2005; Tournaki, Lyublinkaya, & Carolan, 2011).

Professional development should also be designed to meet the needs of the teacher. Teachers are more likely to integrate technology into their teaching when the professional development is aligned to the content they are expected to teach and it is relevant and useful to
their teaching (Penuel, Fishman, Yamaguchi, & Gallagher, 2007). At this time, it is not clear what specific professional development activities teachers feel are most effective to integrate and sustain iPad technology implementation in secondary classrooms. In a recent study of an iPad implementation project, teachers did not feel they had support in the content areas and relied on colleagues and students for support. This study also indicated that pedagogical behaviors of the teachers remained unchanged after the implementation (Benton, 2012). More information on the type of professional development to support teachers is needed to cause pedagogical changes in the way they teach.

**Theoretical Framework**

Challenges exist with technology integration in a 1:1 environment and teacher use of technology on a daily basis. Many studies have been conducted to identify teacher barriers and many of those barriers have been eliminated: the number of devices seem to be ubiquitous, students no longer lack technology skills and are often more advanced than the teacher, the Internet connectivity has improved with wireless environments, technology software and hardware is easier to use, and teacher training is prevalent in teacher preparation programs. There appears to be little effort in the amount of daily classroom integration even with readily available technology and research must continue to find out the underlying cause of the problem (Males, 2011). Research in this area could help identify specific professional development that can lead to higher levels of integration. It could also identify when and where the professional development should take place for teachers to most effectively integrate technology.

Second, if technology has been integrated into the classroom, what additional support is needed to sustain the use of technology integration beyond the first year? Research should be conducted to identify strategies that help teachers to implement and sustain technology use at a
higher level in the classroom (Mills & Tincher, 2003). Identification of what teachers feel is important for professional development allows for targeted professional development in other schools that are initiating 1:1 technology integration plans. Schools often have limited funding and limited time devoted to professional development and often have professional development needs related to curriculum or district trainings in addition to technology. This research could assist in making better use of the professional development funds and time.

Lastly, with the need to teach students the skills required for the 21st century, professional development related to technology as a whole needs to be addressed to change teacher practice. We need to consider how to move teachers toward student-centered practices (Ottenbreit-Leftwich et al., 2010). Sheehan and Nillas (2011) have determined that technology integration, in which students are the primary users of the technology, results in increased student understanding, engagement, and critical thinking. Relationships between student achievement and technology use in a statewide study in Idaho showed a statistical significant effect size different in achievement gains based on whether their teachers used technology (Ravitz & Mergendoller, 2002). Yet, teachers still struggle with student-centered instruction especially related to technology. Student-centered instruction is still problematic as teachers focus more on superficially teaching the technology rather than collaborative problem solving or authentic tasks (Polly & Hannafin, 2010). Teachers lack good models to emulate for effective integration of technology in the curriculum (Bitner & Bitner, 2002). Professional development strategies should be designed to show how the technology could enhance student learning. Research is needed to understand high-quality practices for training teachers on strategies to use technology. Continuing to explore the needs of teachers will help move forward 1:1 implementation adoption plans and advanced professional development strategies to propel teachers to a higher level of
integration (Pogany, 2009).

**Purpose of the Study**

The purpose of this study was to identify professional development activities or topics that are necessary for technology implementation in secondary classrooms with the iPad and also activities or topics teachers still need in order to sustain integration in secondary classrooms. This study also determined if the professional development needs differed based on demographic data of the teachers and the availability of content-specific electronic curriculum resources. Identification of professional development needs that are more strategic towards teachers’ needs can help administration make informed decisions on how to allocate resources for future professional development and move teachers into higher levels of integration.

**Research Questions**

1. What professional development activities/topics do teachers identify as necessary for iPad implementation in secondary classrooms?

2. What professional development activities/topics do teachers still need to sustain iPad use in secondary classrooms beyond the first year?

3. Is there a difference in professional development needs for iPad use based on the demographic characteristics of the teachers?

4. Is there a difference between the professional development needs of teachers and the availability of electronic textbooks, curriculum resources, and iPad apps?
Methods

This study used a mixed methods approach to identify professional development activities and topics that are critical for implementation of iPad technology and what is still needed to sustain the use of the iPads beyond the first year of adoption. A survey instrument was used to collect data on professional development activities and topics critical to implement or sustain iPad integration. The survey was designed by the researcher since a survey tool to identify professional development activities and topics for iPad implementation or sustainability could not be found. The survey included both multiple response questions and open-ended questions. In addition, demographic data was collected on the participants. The focus population was teachers using iPad devices in schools with 1:1 adoption programs and who have been using the iPads for more than nine months. A total of 191 teachers from 10 school districts voluntarily participated in the study.

Data Analysis

Quantitative data from the survey was exported from Qualtrics into Statistical Package for Social Sciences (SPSS). Quantitative data from the survey was used to identify professional development activities and topics needed to implement and sustain iPad use. Quantitative data from the survey was also used to determine if the professional development needs for teachers differ based on the availability of electronic resources. Calculating descriptive statistics and creating frequency distributions comprised much of the data analysis. A Pearson Chi-Square test was used to examine the relationship between the professional development needs and demographic characteristics (the content taught, age, years teaching with iPads, and gender). A Pearson Chi-Square test was also used to examine the relationship between the professional development needs and the availability of electronic resources.
Qualitative data was obtained from the open-ended questions related to professional development challenges, successes, and additional information related to professional development and iPad integration. This data was organized and coded into themes by the researcher. The database of the qualitative data was compared to the quantitative data results.

**Results**

The results from this study were based on data obtained from the survey instrument that included demographic data, quantitative data and qualitative data. Multiple sources of data have been found in studies to be better than a single source of data to lead to a fuller understanding of topic of study (Bogdan & Bilken, 2007).

**Professional Development Activities**

Figure 1. Frequency distribution of professional development activities necessary for iPad implementation and needed to sustain use beyond the first year in secondary classrooms. N=191
Differences exist between the professional development activities for first year implementation and what is needed to sustain beyond the first year. The professional development activities needed for implementation reported by teachers included iPad device training, iPad app training, and learning management training. The researcher expected these results, since during the first year of using the device, it would seem likely more training would be required to learn the device. As technology continues to evolve with the iPad or other devices, professional development during implementation phases would need to address training on the device.

Learning how to use apps on the device was also needed for implementation according to the teachers. New apps are continually being released, but some apps for education are fairly standard within schools. Learning how to integrate the apps into traditional instruction or a former lesson is a challenge that teachers now face. While this finding may be more specific to the iPad, this could be applied to other devices that have similar platforms.

Training on learning management systems was also reported as needed professional development during implementation. Depending on the school district of choice, learning management systems such as Schoology, Edmodo, and Moodle all have different functions for delivery of curriculum. Training on how to upload content, release content for student use, and deliver assessments are some of the various tasks that are needed within the first year.

Lower in priority, but still a need during implementation, was professional development related to instructional strategies with technology. Teaching with technology in the students’ hands, should be less teacher-centered and more student-centered. To keep students engaged, instructional strategies should differ from traditional classroom instruction. The need for
instructional strategies carried through to what is needed during sustaining years. As teachers become more comfortable with the device itself, this appears to be a greater need.

Lastly, collaboration with colleagues on technology was a professional development activity that teachers need not only during the implementation phase, but also to sustain iPad use beyond the first year. A teacher learning from other teachers on how to change lessons or how to use the technology to engage students was reported as critical for professional development by many teachers and was supported in the qualitative data as well.

**Professional Development Topics**

![Figure 2. Frequency distribution of professional development topics necessary for iPad implementation and needed to sustain use beyond the first year in secondary classrooms. N=191](image)

This study shows that teachers feel professional development topics on instructional strategies are a necessity for sufficient integration both during implementation and what is needed to sustain use beyond the first year. Instruction with devices in the hands of students is very different than traditional teacher-centered lessons. This was not surprising to the researcher
because teachers would no longer be using paper and pencil activities, but lessons and instruction would be more interactive using apps and Internet-based activities.

Other topics for professional development voiced by teachers were classroom management and engagement. More teachers identified classroom management as a topic needed for implementation that shifted to engagement as a topic needed to sustain beyond the first year. Classroom management and engagement are two topics for teachers that go hand-in-hand. If students are engaged, classroom management issues are reduced. If a teacher has good classroom management, it is easier to engage the students in learning. Simply putting the device in a student’s hands does not guarantee engagement or classroom management. The information provided from the qualitative data indicated an increase of students being off-task and trouble with students playing games or being on sites other than what was supposed to be used for instruction. Therefore, teachers expressed frustration and value in professional development related to this topic of management and engagement.

Course design and assessment seemed to be less important topics for teachers for professional development during implementation compared to what is needed for sustaining use. The researcher suspects from personal experience that as a teacher becomes more familiar with how to use the device, the activities and topics would naturally shift to better instructional practices and course design or assessment. This was also found in a 1:1 study when integrating laptops; there is an evolution that occurs once teachers become familiar with the functionality of the device (Pogany, 2009).

**Qualitative Interpretation**

The qualitative data further sheds light on the specific challenges and successes with professional development and additional information related to iPad integration that was not
captured in the close-ended questions. Classroom management and engagement seems to be a greater challenge with the iPad device and teachers reported the need for professional development in this area. While other studies have indicated increased engagement with technology use, teachers voiced management and engagement as a challenge with issues related to gaming. Perhaps this is a natural occurrence with the iPad since one primary use of the iPad device is iPad gaming apps. Many teachers mentioned that students have a hard time transitioning from gaming to a learning device. The results are similar to results in a 1:1 integration study with laptops in that classroom management is different with a classroom of students looking at the devices and the social interactions and attention of students changed (Pogany, 2009).

Lack of time for training and time for collaboration were also concerns with many teachers as a challenge to the professional development for iPad integration. This correlates well with the activities teachers identify as critical for implementation and needed to sustain iPad integration beyond the first year. The challenges of learning how to use the device or a specific app and then having no time to play or incorporate that into existing lessons was reported. Time to collaborate with colleagues was limited and some of the successes of the professional development happened when they could learn from others. One teacher stated, “Collaborating with colleagues has been the most beneficial to me. We all have things that work well, and it’s very important to share those ideas.” Another reported, “When we have time to see how other teachers are integrating iPads into their curriculum and are given specific ideas to use in our content areas, I feel that the PD is successful. Most people are intrigued by seeing awesome ideas others have and think, ‘hey, I could do that’, that’s pretty cool.” The need for collaboration and
time was a major finding in other technology integration studies (Pogany, 2009; Sugar & Kester, 2014).

Another significant theme that emerged from the challenges, successes, and additional information is how the professional development training is delivered. The teachers reported challenges with having large group professional development or a one-size-fits-all approach. Teachers have varied abilities and expertise with technology. One teacher expressed this concern in this way:

The biggest challenge my colleagues and I have faced is that a majority of professional development related to iPad integration is geared toward users who are least familiar with the device or its use. This means that I, along with some friends, are often bored at these PD events, because we already know how to use apps and are comfortable with the iPads. Some teachers, including myself, in our school are proficient with iPads and integrate tech into the curriculum with little or no problem; others don't know how to do simple functions such as getting to their camera roll. This makes PD frustrating-I feel like I do not learn anything.

Teachers reported success when professional development was delivered in small groups and differentiated based on the needs of the teachers. “Offering breakout sessions with a different focus for different learner needs (beginning skills, assessment on iPads, student engagement, etc.) was really respectful and beneficial. Also, training that simulates actual activities we could do in class was also very helpful”, reported one teacher. Differentiated professional development was recommended to best address the diverse needs of staff in a similar study with 1:1 laptops (Donovan, Hartley, & Strudler, 2007).
Additional information regarding the qualitative responses is that teachers did not comment on too much training, but rather commented on lack of training, needing more training, ongoing training, and how future training should be designed to meet the needs of the teachers. These results provide evidence that if the training is provided, and teachers are given time to work and collaborate; the integration will likely follow in the classroom. Other research supports these findings that for professional development to be effective it needs to be ongoing and highly focused for improving instruction (Sugar & Kester, 2014; Tournaki, Lyublinskaya, & Carolan, 2014).

**Demographic Comparisons**

To determine if the professional development needs for implementation and to sustain iPad use had any relationships with the demographic characteristics of the teachers surveyed, a Pearson Chi-Square analysis was used. The demographics analyzed were gender, age, frequency of iPad use, length of time using the iPad, and whether or not electronic resources were available. Analysis of demographic data and the professional development needs showed a few trends that have not been seen in other studies. There was no relationship between the professional development needs and academic content area or the frequency of use. Regardless of the content taught or how often teachers used the device, there was no difference found in what teachers needed related to professional development. This was also reported in a technology integration study by Gorder (2008).

Age seems to be a bigger factor with the professional development needs. Younger teachers (ages 21-30) seemed to need less device training, training with apps, and one-on-one coaching, where the older teachers (ages 50 years or more) needed more training with the device, training with apps, and one-on-one coaching. This was not surprising to the researcher since
younger teachers would be considered more digital natives having experiences with devices providing a comfort level different than that of older teachers. Classroom management results seemed to be the reverse where younger teachers (ages 21-30) showed a greater need for classroom management and older teachers (ages 41-50 and ages 50 and older) less of a need. This also was not surprising, as younger teachers tend to have less experience with classroom management in general. This information supports the need of differentiated professional development as indicated in the qualitative responses.

The professional development needs related to length of time using the device did show some differences. Teachers who have used the device longer (19 months or greater) showed the need for professional development for device training and instructional strategies during implementation, and those using it from 0-9 months did not need this training. This was surprising to the researcher, that those who had used the device for a shorter period of time needed less training. The increased availability of iPads in recent years for personal use may have contributed to this result as more and more people are using this technology on a daily basis. This also may be attributed to age, with a larger group of older teachers in the “who have used the device 19 or more months”; they might be the group of teachers who indicated the need for more device training and instructional strategies for professional development. Another possible reason for more training needed for those who have used the device 19 or more months, may be due to the lack of professional development when the adoption in their school took place.

The professional development needs related to the availability of electronic resources showed no relationship except for collaboration. The teachers who indicated there were sufficient electronic resources reported the need to collaborate with colleagues during implementation. This supports the earlier results that listed collaboration with high frequency
being needed for both implementation and for sustaining iPad use. This also supports the information provided with challenges and successes with professional development. Teachers voiced the challenge of not having enough time to collaborate and had the most success with professional development when allowed to collaborate with colleagues.

**Conclusion**

The findings of this research have implications for teachers, administrators, and those organizing professional development efforts related to technology integration plans in 1:1 environments, specifically with iPads.

For teachers to integrate and sustain iPad use beyond the first year, it is clear from teachers that professional development is essential for technology integration both for implementation and to sustain use. It is also clear that professional development needs are different in the first year as teachers learn the device. Device training, app training and learning management are critical during year one. Collaboration and learning about instructional strategies seem to be an ongoing need for professional development with iPad integration. Teachers should be encouraged to participate in the training provided to improve and increase classroom use. Teachers voiced a strong emphasis on learning from each other and time to work as critical components for professional development.

For administration and those planning professional development, providing differentiated professional development seems to be very important with technology integration. Level of comfort and expertise can be very different among teachers. Recognition of the various technology levels, learning styles, and implementation rates should be taken into consideration when designing professional development. In addition, meeting the teachers where their needs are, providing frequent training with adequate time to collaborate with colleagues was viewed as
the most successful professional development. Professional development traditionally is very structured and a one-size-fits-all approach. Creative approaches with professional development to be less “teacher” directed instruction and a more “student” centered approach where teachers are working together would benefit teachers most. The shift of student-centered classrooms should be consistent with professional development being teacher centered. One common type of professional development that is emerging is the idea of an “unconference” or “open space” conference. This type of professional development activity has also been given the name “ed camps”. This is where groups of professionals collaborate and design professional development around what they need on the spot, rather than a structured session approach. The outcome is not predetermined. This type of professional development provides structure for a community of learners to identify their learning need and be empowered to address that need (Herrington, 2006; Kenny, 2014). As technologies continue to change, giving teachers time to “play” with the technology together might just be the best approach to professional development.

Future research should be expanded to devices beyond the iPad to see if the needs are the same for technology integration with a wide variety of devices. Identification of specific instructional strategies may also be an area that should be investigated in future research. Teachers identified the need for professional development related to instructional strategies was needed but which instructional strategies are the most effective has not been identified.

Lastly, past studies have investigated barriers for teacher use. Many of the barriers such as Internet access and device access have been eliminated. With 1:1 adoptions, the vast majority of teachers should be using technology on a daily basis, yet only 65% of the participants in this study were using it daily. It is still unclear what is preventing some teachers’ use of technology.
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