

The Effects of the Use of iPads in Secondary Physical Education

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## Abstract

While mobile devices appear to be commonplace within the youth of today's lives, implementation of this technology within schools is much less conventional. This study investigates ways to improve engagement of students in Physical Education classes to inspire students to make healthy lifestyle choices. Little research has been done on successful integration of mobile devices in Physical Education classes. It appears that the existing barriers to the adoption of technology are more commonly found around teacher pedagogy, as opposed to access and resources. Physical Education study participants in this project implemented the use of iPads in their teaching practice for one month, and the results revealed that there was some shifting of teacher beliefs, and there was success with the use of the technology in terms of teaching and learning.

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## The Effects of the Use of iPads in Secondary Physical Education

It is clear that mobile technology is a significant part of our current society. It is evident that today's youth are prime examples of this, spending much of their social time using technology. This study attempts to examine the potential of using mobile devices, specifically iPads, when teaching Physical Education to secondary school students.

There is evidence out there that states that our schools are not necessarily meeting the needs of our Physical Education students, and that participation rates in active lifestyles in adolescence is low. This study will outline how currently students are expected to participate in physical education classes that have very little connection with their outside lives. The project proposes that mobile devices can be used as a bridge to reconnect and re-engage students in Physical Education classes. In an attempt to motivate Physical Education students, this study implements iPads into Physical Education classes in hopes of inspiring students to engage in the course work, and to rethink healthy lifestyle choices. The study will aim to answer the following questions: 1. What are the effects that mobile devices have on student engagement for the required course work? and 2. What factors impact the teacher's planning for and use of the mobile devices?

This study takes place in two Secondary Schools, both located in urban settings and in mid-sized cities in Ontario, Canada. One school is populated with approximately 2000 students and the other closer to 1000 students. The larger school consists of a more diverse population and has considerably more resources school wide, compared to the other, smaller school, containing fewer resources throughout the student population. For the purpose of the study, a

cart containing 30 iPads with the capabilities of charging the devices and loading APPS as well, was supplied by the faculty of Education at the University. Both study participants implemented the iPads in co-ed Physical Education Fitness classes at a mixed, University/ College level.

Currently there appears to be a gap in the literature that connects mobile technology to Physical Education classrooms. This study is important because there is evidence that physical activity can promote healthy lifestyles and longevity. Schools are an integral part of our society, so it would make sense for schools to be considered an excellent setting for student populations to acquire this critical message, regarding healthy lifestyle choices. It is evident that there is ongoing change in many industries through the adoption of technology, and one can conclude that education is just another industry that also should keep up with technological change.

This paper uncovers several learning theories that address the pedagogical concerns of the integration of mobile devices into learning environments. It is clear that a common thread to these learning theories is a shift from teacher- directed to student -centred learning environments. This study discusses the fact that technology provides opportunity for project -based, independent learning, and so in turn, there is evidence of successful integration of mobile devices when the classrooms are student- centered.

This paper will cover concerns around the barriers of integration of mobile devices into classrooms, including the extent to which teacher beliefs have impact, and, what successful, current teaching practices that use technology look like. The study provides study participants the opportunity to implement the use of iPads in their Physical Education classes and share their experiences.

## **2.0 Literature Review**

### **2.1 iPads for Health and Longevity**

There is limited literature covering the use of technology, specifically iPads, in Physical Education classes. However, recent work available indicating the benefits of the use of mobile devices in an educational setting can be applied to the Physical Education classroom. According to Achrazoglou, J., Bills, D., Ochola, E. and Stachowiak, J. (2013), mobile devices can benefit students' learning by improving skills such as communication and decision making, and by raising self-esteem.

The challenge of meeting the needs of students is not new. Over 10 years ago, Prensky (2001) noted that the students of the day were not those for whom the educational system was designed, and with the current speed of technological development, that statement continues to be proven true every day. It is clear that mobile technology offers students a more current learning environment that allows them to feel connected to the classroom and curriculum. Evidence shows that it would be logical for teachers to use the fact that this generation of students is more aware of technology than any before, to influence their students by using these mobile devices to inspire learning.

Implementation of the Ontario Physical Education Curriculum could be more effective if teachers could realize the potential positive impact mobile technology can have on teaching and learning today. Physical Education provides an opportunity to expose students to better choices for leading a healthy lifestyle. Living an active lifestyle is important and educators can teach and model this for students. According to the 2012 Active Healthy Kids Canada Report Card

(2012), just under 50% of Canadian kids get 3 hours or less of active play per week and that is including weekends.

Frankish, Milligan, and Reid, (1998) state that the implementation of a physical activity and leisure to one's welfare is validated in the ideal of a sound mind in a sound body. "Health is a resource rather than a reason for living" (p. 287). To give meaning to the connections between active living and causes of health one must consider both personal lifestyle and surrounding social, economic and environmental factors (Frankish et al., 1998). Education is a common theme to these factors so should be utilized as a venue to have impact on our society to promote healthy living. "Increasing physical activity in adolescents is now becoming the target for health promotion "(Watterson, 2012, p. 16).

According to Larson and Bruce (1987), "Regular exercise results in increased maximum aerobic capacity due to peripheral changes in muscle and also due to cardiovascular changes with increased stroke volume and cardiac output in normal persons. Thus, regular exercise could conceivably lower functional aerobic age by slowing this functional decline" (Larson & Bruce, 1987).

Regular exercise promoted through Physical Education classes in school can inspire health, wellbeing and longevity. In order to reach students, the use of current technological affordances is one way to make the curriculum more engaging and engagement is important. "Engaging in physical activity has been linked to improved health status in children and adults, and is considered to be one way to fight the obesity epidemic" (Watterson, 2012, p. 2). Life-long learning regarding healthy living is something that educators can promote in schools and technology can be an integral part of this critical message. Increasingly this focus in Physical

Education classes can motivate students to participate in healthy life choices and, in turn, can allow future generations to experience health and longevity.

Currently, there needs to be progress made in education meeting the needs of our existing student population. “Research has found a statistically significant decline in physical activity in both males and females from the ages of 14 to 18 years and an age linear model decrease of .16 days with each increase in aged year” (Allison, Adlaf, Dwyer, Lysy, & Irving, 2007 cited in Watterson, 2012, p. 17). Watterson also states that, “In 1995, George Graham discussed his concern that the traditional teaching methods and curricula that are common to physical education programs are not necessarily providing students with experiences that are enjoyable, meaningful, or beneficial” (Watterson, 2012, p. 6). The use of mobile technology can meet the requirements to inspire the youth of today in a learning environment, in turn providing healthy lifestyle knowledge that can be applied in everyday life. “There is growing interest among researchers about the use of technology to change students’ behaviors relative to nutrition and physical activity inside and outside of school, especially in light of the growing epidemic of childhood obesity” (World Health Organization, 1997, cited in Watterson, 2012, p. 1).

Watterson also claims that by defining the needs of today’s adolescents, the teacher and student interaction can be improved and create a better link to the student’s enjoyment of a healthy lifestyle. He finds that students did not perceive winning or competition as high attributes of their classroom experience, but rather the interaction of their peers and teachers were determinant factors. These results indicate that the teachers themselves and their connection with students, had positive impact on learning whether the students enjoyed or disliked the physical education class (Watterson, 2012).

## 2.2 Success of iPads in Learning Environments

Achrazoglou et al., (2013) indicate that there has been an 8 % increase in teenagers owning their own personal iPads from 2010 to 2013. Madden, Lenhart, Duggan, Cortesi, and Gasser (2013) state that an American survey of 802 teenagers, from 12 to 17years old, shows that 23% have a tablet computer which can be compared to a level of the general adult population. One might conclude that many of our high school students would prefer using a familiar tool in a learning environment for research and communication. Even though not all students may have access to a tablet, one or two tablets available within a learning environment could provide additional learning benefits compared to none.

By putting technology into perspective, Achrazoglou et al. (2013) state that laptops and desktop computers are a thing of the past and that handheld devices are this generation's tool of choice. Handhelds are an excellent device to help students express themselves in creative ways, organize their projects and collaborate with their peers. Other benefits of handhelds are that they can assist with students and teachers being able to communicate in diverse ways (Archrazoglou et al., 2013).

The multiple affordances of iPads provide an instant networking system allowing teachers and students the ability for prompt feedback. In turn, this will have a direct impact on student engagement; when teachers have the freedom to access work for instantaneous assessment, student have prompt feedback to be inspired to make improvements. According to one group of researchers,

The iPad has changed the way a student accesses all types of information – media, academic research, and books – for a lower cost than a laptop. It is a gadget that students want to make use of, and allows them to engage interactively with new content, find

information quickly, and have access to a library wherever they are. (Beagle, 2012, para. 2).

Beagle (2012) continues that iPads can stimulate creativity and provide opportunity for hands-on learning unlike any other tool used for teaching and learning within a classroom.

In another study, Milman (2012) states that, “Projections of exponential growth in numbers and use of mobile devices in classrooms suggest a pressing need to understand associated pedagogical practices, effectiveness, and implications for education, as well as necessary conditions for successful implementation, and investigation of outcomes” (p. 5). Milman (2012) discusses how “differentiating instruction can be done in three key areas: 1) content, what students learn; 2) process, how students learn or make sense of the content; 3) and product, how students show what they have learned” (Tomlinson, 2001 cited in Milman, 2012, p.13). With further understanding of these mobile devices and the benefits that they can bring to learning, the more positive impact that education will have with student success. Also, with the differentiated instruction that iPads provide, there are endless resources across the curriculum for all levels of students.

iPads do provide opportunity for various levels of and types of curriculum but, there are some areas of distinction. Beatty, Johnston and Stoll (2011) highlight that classrooms making the most of iPads tend to present in STEM teaching areas (science, technology, engineering and math) and that the reasons may have to do with the point on the evolutionary hierarchy the iPad currently occupies. They draw the conclusions that the most impressive educational APPS available focus on the hard sciences, stating

It's simply impossible not to understand the properties of mercury better when looking at it in 3-D using an app like 'The Elements.' Mathematical equations jump off the screen and

twirl around at the touch of your finger with ‘Quick Graph.’ A virtual sky is dotted with the names of the heavenly bodies in ‘The Pocket Universe.’ “(Beattey Johnston & Stoll, 2011, para. 11).

Due to the lack of extraordinary education APPS available for social science curriculum, iPads are seen as more of a means to view content whereas the science teachers are able to report using the iPads to manipulate and create content (Beattey Johnston & Stoll, 2011). This literature supports the connection iPads can have with Physical Education curriculum covering material dealing with both movement and science. Physical Education programs can provide students the opportunities to use iPads for capturing video for use in motor skill learning and biomechanical analysis. One can conclude that iPads are more effective where material can be manipulated which clearly sets iPads apart from notebooks or other tablets due to its use of APPS.

An iPad can be used as a key tool for learning when a student is struggling with a concept. A video or electronic version of an assessment provides students with the luxury of being able to review the correction as many times as required for further understanding, and the mobility provides students a classroom without walls. “Accessibility, engagement, and mobility are very important to both student and teachers” (Achrazoglou et al., 2013, para.11). The mobility of the iPads does not require a student to relocate to a computer lab, and they can replace paper books as students can instantly download literature for free.

Achrazoglou et al. (2013) describe the endless tools that the iPad offers Physical Education classes providing stopwatches, calculators, data collectors including nutrition tracking APPS making for a more efficient, student-centered learning environment. Also, specifically referring to the Physical Education classroom, Beagle (2012) draws attention to the benefits of

an iPad's motion sensor allowing students to manipulate using their hands in guiding the iPad, then being able to measure levels of exertion, balance, and repetitions. The iPad provides opportunities for instant note taking, documentation and instant response to questions (Beagle, 2012).

In addition to academic benefits, Achrazoglou et al. (2013) bring forward the impact that iPads have on the classroom through self-esteem and relationship building. There is evidence that students feel empowered by the responsibility of being trusted with such a device, leading to improved relations with the teacher, and potentially the student being more productive with the iPad both in and out of the classroom.

### **2.3 Theoretical Framework : Ertmer and Park (2007)**

Despite the benefits that mobile technology can bring to a learning environment, the integration of iPads does not come without issue. Ertmer and Park describe the difference between external and internal barriers when implementing technology as follows

External, or first-order, barriers include a lack of access to computers, software, planning time, or administrative support. Internal, or second-order, barriers relate to teachers' beliefs about instructional technology, preferred teaching methodologies, and willingness to make changes to classroom practices. First-order barriers are more easily recognized and easier to fix while second-order barriers may require major changes in teachers' beliefs and daily teaching practices. (Ertmer & Park, 2007, p. 247).

In this study, both participants expressed having experiences with each level of barrier. One participant mentions that the iPad cart itself caused challenges with mobility due to it being so cumbersome. The second participant notes there was a sense to look at different teaching practices, specifically student-centered, to assist in a smoother adoption of the iPads into the learning environment.

First-order barriers such as policy, equipment and time are factors that affect the adoption of technology. Achrazoglou et al. (2013) highlight policy as being an important factor to consider as a barrier to the adoption of technology and that policy issues are always complicated. Finding a unique balance can be very tricky given the timeframes at which technology is evolving. With this in mind, it is vital that policies address ownership, curriculum goals, integration plans, implementation models, classroom rules, professional development, and set-up and on-going management (Achrazoglou et al., 2013).

#### Ertmer and Park (2007) First and Second Order Barriers

First Order	Second Order
Resources	Beliefs
Training	Values
Time management	Pedagogy

Butler and Sellbom's (2002) research indicate barriers to the adoption of technology; their faculty members reported a 30% equipment failure or malfunction and 14% struggle with time being an issue to learn new technology. According to Manuguerra (2011) cultural change of teachers is required, and this becomes a barrier when the technology level required to evolve is too high. Manuguerra also indicates that to enable such change, teachers need a new generation of devices and software that are user friendly without too steep a learning curve and the iPad appears to fit this perfect balance.

The next section focuses on the second-order barriers to the integration of mobile technology within a classroom. As stated by Ertmer and Park (2007), training and access are no

longer measured as significant barriers; currently, teachers' beliefs seem to be the focus of potential influence. Pedagogy is one critical factor in the adoption of technology process.

## 2.4 Pedagogy

Beattay Johnston and Stoll (2011) express that the iPad most definitely has more effective application in some pedagogical situations than others. The success of the adoption of mobile technology is directly related to the individual teacher in charge of the classroom. Ertmer and Park, 2007, report that,

According to Miller and her colleagues (2003), teachers' beliefs about technology are comprised of three related, but independent components: pedagogical beliefs about teaching and learning, self-efficacy beliefs about technology use, and beliefs about the perceived value of computers for student learning. (Miller et al., 2003 cited in Ertmer & Park, 2007, p. 248).

Ertmer and Park's (2007) research indicates that experiences during pre-service programs have great influence on teachers' beliefs about teaching, learning, and technology. "According to Richardson (2003), belief change in preservice teachers is more important than knowledge transmission during teacher preparation because beliefs impact action in more critical ways" (Richardson, 2003, cited in Ertmer & Park, 2007, p.248). From these statements one might conclude that teacher beliefs are what will shape and direct teaching and learning within a classroom.

In the review of Mumtaz, it is argued that teachers' resistance to the adoption of technology was divided into several themes ranging from resistance to teachers' perceptions including personal and psychological factors (Mumtaz, 2000). It appears clear that teachers' personal values have an effect on how curriculum is delivered in classrooms of today and keeping these perspectives in check, guiding teacher beliefs in the direction that is needed for a

positive school culture, will assist in shaping a school's community. According to Beattey and colleagues, "It's [the iPad] a tool, like any other, and in the classroom it must always be thought of as being in the service of pedagogy. The pedagogical foundations must be solid, because the tool will achieve no heights the underlying pedagogy will not support" (Beattey Johnston & Stoll, 2011, para. 9). They also state that,

Despite claims to the contrary, the iPad has not and will not transform education, because true transformation in teaching comes only by examining our teaching philosophy, testing our beliefs about how people learn and adjusting our methods in response. But, that doesn't mean that the iPad can't help with that process. (Beattey Johnston & Stoll, 2011, para. 15).

Pedagogy is the focus and the iPads can be used as the vehicle to achieve a common goal. Mumtaz (2000) makes note of the characteristics seen in teachers who successfully integrate technology into their classroom. Mumtaz states that these teachers tend to have a positive attitude towards technology in general and tend to run student – centered classrooms in general, empowering students and giving them choice. Mumtaz (2000) expands on this indicating that teachers who preferred directive styles of teaching tend to rate their own competence as low and often make use of student assistance with technology. This statement supports and reiterates that the use of technology tends to be combined with constructivist practices leading to pedagogical practices that have the potential to shift. The more exposure and success a teacher experiences with the use of mobile technology, the more potential to continue the use of technology which results in changing beliefs and school culture. Ertmer and Park's (2007) research indicates that teachers who have student-focused beliefs tend to use technology more often and use it in more significant ways. Ertmer and Park (2007) find also that lower forms of technology use such as word processing tend to be associated with teacher-centered practices while higher level uses such as engaging students in inquiry-based

or project based activities, tend to be connected with student-centered practices. Ertmer and Park, in review of others' work, discuss that in order to change teachers' practices involving the use of technology it may be imperative for teachers to adopt more student-centered beliefs as teachers will base their practices on their beliefs (Ertmer & Park, 2007).

In summary then, it is critical to consider that change takes time and when teachers feel that they have a clear understanding of the reasons for educational change, they are more likely to proceed without conflict. Teachers may not necessarily be denying the need for change, but often feel that they are expected to lead new initiatives without opportunity or guidance to make sense of the new technologies themselves. Consideration of different theories of learning might shed some light on these issues.

## **2.5 Learning Theories**

Attached in Appendix D is a theoretical framework to represent a visual outline of the learning theories that are associated with the integration of iPads in Physical Education classes.

**2.5.1 Engagement Theory.** Kearsley and Schneiderman were leaders in the engagement theory in 1999. They stated that the engagement theory model is based around the idea of creating collaborative teams that work on aspiring projects that would have meaning to someone outside the classroom. Kearsley and Schneiderman dissect the model with a focus on three components of learning activities, occurring in a group context, project –based and having an outside (authentic) focus.

The use of iPads in the classroom can allow students to explore self -directed learning and many other forms of experiential learning including project-based learning. Mobile devices offer students a sense of self- efficacy providing a feeling of control over their personal learning.

This sense of control affords confidence to work with peers and challenges students to explore for answers together in group context. Teachers do not necessarily have to be the end of the line for resources when mobile technology is available. Many students have access to these devices on a daily basis, exploring within their interest areas and at their leisure, so to then apply the iPad use within a leaning environment allows students to connect the curriculum to the outside world providing richness to what they are learning. iPads can encourage and inspire students to research and complete tasks that they would not otherwise take part in simply because they enjoy using these tools on a personal level. Mobile technology can motivate learning outside of the classroom.

**2.5.2 Situated Cognition Theory.** According to Smith and Semin (2007) situated cognition theory states that knowledge is then bound to physical, social and cultural circumstances and that knowing is inseparable from doing. With this statement, one can interpret learning to be something that evolves from an individual's progressively effective performance across situations rather than in terms of an accumulation of information. By applying this theory in the classroom it would encourage educators to use mobile technology to immerse learners in an environment that approximates as closely as possible the context in which their new ideas and behaviors will be applied. “Students today do not know a world where high speed Internet is not available, and they will spend nearly all their waking hours using media and technology.” (Watterson, 2012, p.3). iPads can provide an educational environment that will allow students to learn knowledge in a circumstance that imitates the way they are socially and culturally familiar with and will be used in real life. Learning in an environment of familiarity breeds confidence and students will be motivated to take more risks having positive impact on student learning.

**2.5.3 Constructivism.** According to Burr (2007) constructivism is a theory to explain how knowledge is created when information connects with existing knowledge that had been developed through experiences. Some examples that Wikipedia (2013) provides for the application of using constructivism for teaching and learning are discovery, hands-on, experiential, collaborative, project-based, and task-based learning. Many, if not all these applications are related to the use of mobile technology and this indicates that iPads can bring knowledge to students based on experiences. iPads provide endless amounts of quick access to resources, so students are constantly exposed to experiences where they can gather information to generate thought. In addition, iPads can be implicated as a constructivist type tool in that the students are familiar with them using them for social media or entertainment, and then can also apply the devices in a learning environment such as Physical Education where social interaction is often a big part of the learning process. As well, the comfort level of the students using the familiar tools can make learning about sometimes sensitive topics in Physical Education a little easier. Park and Ertmer (2007) theoretical stance seems to support this theory being connected to the use of mobile technology stating that engaging students in inquiry-based activities and collaborating with peers at a distance tend to be associated with student-centered, or constructivist, practices.

**2.5.4 Social Development Theory.** Mcleod (2013) outlines Vygotsky's social development theory, and highlights The More Knowledgeable Other or MKO, referring to anyone who has a better understanding or higher ability level than the learner, with respect to a particular concept. Generally, as per Mcleod (2013), the MKO is thought of as being a teacher; however, with the use of mobile technology in a classroom, the MKO could also be considered the student, or student peers or even the iPads themselves. This concept and the use of iPads can support the

concept of a Flipped Classroom, where there is a shift to a student-centered classroom and the student plays a more active role.

Ertmer and Park (2007) describe problem-based learning as an effective method for shifting teachers' beliefs. Teachers' practices with this teaching and learning style show changes in their proposed teaching practices from teacher-directed to student-centered learning (Ertmer & Park, 2007). In addition, the use of iPads and the MKO model of teaching and learning would require that the teacher relinquish some control in the classroom having the students look to new material from an online source and then work with the teacher on the activity or homework assignment. This allows the teacher to collaborate with students in order to help facilitate meaning within the classroom. Learning; therefore, becomes a reciprocal experience for the students and teacher." When students and instructors are partners in the collaborative and informative assessment process of students' success, research reveals that the result is profound involvement gains for all students" (Achrazoglou, Bills, Ochola, & Stachowiak, 2013, para. 1).

Mcleod (2013) discusses another important concept from Vygotsky's theory called The Zone of Proximal Development. As per Mcleod (2013), this is considered the distance between a student's ability to perform a task under guidance and their ability to solve the problem independently. This zone of learning is explored when integrating mobile devices into the Physical Education classroom environment. iPads allow students the opportunity for self-directed learning; students can explore and solve problems independently working with their zone of proximal development, with a wealth of knowledge and resources at their fingertips using a tool that they are familiar with.

This literature review did discuss learning theories including first and second order barriers, it did describe the importance of technology use in Physical Education classes and did present a gap in terms of the specific use of iPads in Physical Education. This literature did not answer the specific questions related to the study 1. What are the effects that the mobile devices have on student engagement for the required course work? And 2. What factors impact the teacher's planning for and use of the mobile devices? The following methodologies were used in attempt to help fill these gaps.

### **3.0 Methodologies**

#### **3.1 Introduction/Overview**

This study used qualitative analysis to examine teacher responses to technology and iPad use in Physical education classes. The primary means of analysis was Case Study as defined by (Cresswell, 2013, p.105). This study used multiple sources such as surveys, online journals and reflective summaries, and analyzed data through description of the case themes as well as cross-case themes. The study report developed a detailed analysis of one or more cases. The research questions investigated were: 1. What are the effects that the mobile devices have on student engagement for the required course work? and, 2. What factors affected the teacher's planning for and use of the mobile devices? As the variables are unknown and concepts are based on the study participants' opinions and beliefs, this type of data can be considered constructivist and interpretive, and so the research paradigm is qualitative. The participants in this study were two teachers from different schools. The study participants were assigned a set of 30 iPads to use from May 7, 2013 to June 7, 2013 for instruction with their students. The iPads were used by the

teachers and students for 75 minutes each day, on which they were asked to employ a variety of content-based applications. The 2 different classes consisted of mixed male and female, Grade 11 Fitness Physical Education students, and the iPads were used for researching, exploring curriculum and to gain insight on skill development, and to monitor student fitness progress with the use of APPS such as myfitnesspal.

### **3.2 Phase 1 - Initial teacher technology experience Survey – Survey Monkey**

The first component of this study consisted of an initial survey created on Survey Monkey. The initial survey was completed to provide an understanding of the background that each of the study participants had with regards to past experiences using technology in a classroom. The study participants were given a 20 minute, online survey using Survey Monkey consisting of 10 questions outlining past experiences with the use of technology in a classroom. Survey questions, as indicated in Appendix A, included how long the study participants have been teaching, their past experience using technology in class and information regarding professional development and training with technology in the classroom. The study participants completed the survey online where the principal investigator then collected the data from the Survey Monkey website.

### **3.3 Phase 2 – NING Journaling**

Once the iPads were in the hands of the students and teachers, being used for teaching and learning, the second component of the study had participants commence in approximately 6 weeks of journaling and posting discussions on the social website, NING. NING is a social network website used for communication in the form of blogging and messaging members. The NING network provided a forum study participants and the principal investigator to dialog about

experiences with the iPads in the classroom, communicating back and forth with prompting questions from the principal investigator labeled in Appendix B. The study participants were asked to comment and answer questions on a daily basis with both the principal investigator and each other. Data collection revolved around discussion points relating to the integration of iPads in a Physical Education classroom. The rich conversations and qualitative data from the NING were analyzed with supervisor support.

### **3.4 Phase 3 – Final NING Reflective Summary**

Finally, in the third component of the study, participants were asked to produce a reflective response of their experiences using the mobile technologies in their classrooms discussing the factors that affected the planning, implementation and the student use of the mobile devices . The final summary was also communicated on the NING with guiding questions provided by the principal investigator outlined in Appendix C. This final reflective summary provided an opportunity for study participants to reflect and share their most significant teaching and learning moments with the iPads, and to be able to synthesize the experience.

### **3.5 Phase 4 - Final Reflections**

Data analysis for each component came from online dialogue through blogging, journaling and with supervisor support. The principal investigator and the study participants communicated back and forth with questions, answers and reflective dialogue. This allowed the principal investigator to collect these written thoughts and explore meaning in terms of engagement of students with iPads, and barriers to teachers' integration of the technology. The

principal investigator was able to compile the study participants' interpretations and link meaning to literature related topics to iPads in the classroom, seeking both connections and gaps.

The subsequent steps were followed to analyse the data (Cresswell, 2012, p. 260-262). All of the data was first gathered and compiled, then was examined to look for key themes. The data was reorganized under the key themes for example, barriers to integration of technology. The review of the literature allowed the study to align the findings with the literature. The findings were then reported by the Case Study outlining subsections such as challenges and successful moments with the integration of the iPads into the learning environment.

This study examines the benefits of the use of iPads in a learning environment, and specifically in a Physical Education class, in order to examine the potential benefit of technological devices inspiring students to choose healthier lifestyles. This study also explored resistance and barriers that exist for both teachers and students, that may interfere with the integration of these mobile devices into a learning environment. A possible limitation to the study is the small sample size of study participants.

## **4.0 Findings**

### **4.1 NING Social Network Site for Discussion regarding iPad experiences in the Classroom**

The following findings are categorized into topic sections that evolved as the iPads were integrated into the Physical Education classes in an attempt to answer the following questions:

- 1) What are the effects that the mobile devices have on student engagement for the required course work?
- 2) What factors impact the teacher's planning for and use of the mobile devices?

### **4.2 Introduction to the iPads and primary challenges**

Connectivity seemed to be the most prevalent issue that both study participants discussed. It can cause problems not only due to the wireless instability and security blocks, but also due to the drastic inconsistency throughout difference environments. For instance, it was noted that the iPads connected fine to the wireless network in the portables but had issues making connection in the weight room. The good news about this specific issue of connectivity is that the problem does not directly relate to the actual iPad itself, but rather a peripheral issue that needs to be addressed at another level. It is clear that the tool is not the concern but systemic support of the tool is an issue.

Transportation of the iPads was another area of concern. Participant A stated that, "Getting the iPads from class to class was a pain, especially when I had to use the elevator to move the cart, and more so when the elevator had broken down". It would make sense that the role of technology should be to streamline a process, but this transportation obstacle appeared to give resistance to the practice of using iPads.

The endless variety of APPS creates an abundance of resources; however, it seemed as though the most significant APPS had a cost involved. Participant A noted, “There are tons of APPS and if you had deep pockets, I'm sure you could find an APP for each of your needs in each of your classes.”

Damage control was an ongoing challenge and fear for the study participants. Participant A claimed, “Things seem to be going well, but I am still really nervous about the safety aspect of these iPads. I'm particularly nervous about them getting stepped on or broken, especially because they don't have cases.” Because the iPads were being used with Fitness classes, the teachers were afraid of accidental damage in a weight room or when out for a run. Physical Education involves tasks requiring lots of movement with the technology, which makes the technology more vulnerable to mishaps. Also, lack of ownership by students may cause them to be less careful than they would if it were their own iPad.

Account Settings were an issue for study participants mostly due to the individualization required for each iPad. Participant A,” The APP we are currently using is great (videos, drag and drop controls, vivid pics), although we are having issues with User Accounts. I'm not sure if it's user error or the specific app, Full Fitness HD, but with having multiple users on a single iPads, the workouts the students are designing are being affected (ie. deleted, merged) each time they activate their account.” Participant B also stated, “sometimes the iPads were frustrating to use, especially with multiple users. We had a number of issues with students erasing other student's work.”

Time on task by students was an ongoing challenge for the teacher participants as the novelty of the devices created ongoing curiosity among the students. Participant B stated, “I'm

also finding that the students seem to get blinders on once they have the iPads, it is difficult to get them back when I'm trying to give instruction. They also are playing with other apps and the camera on a consistent basis. It is hard to track to see who is on task. Participant A added to the fact that students were wasting valuable learning time, stating,

Seeing the students get excited over new technology and simply wanting to play and take pictures of themselves made me realize that some students do not have access to this technology at home, so interacting with it as school is a new experience. I hope the novelty wears off, as off task behaviours are still an issue.

As the project evolved, there seemed to be evidence of improvement with the issue of off task students from Participant B, "As we continued, we found it was less of an issue because the technology was not as 'new' and it became more of a tool than a toy."

#### **4.3 Most unexpected obstacle**

Participant A noted that he was surprised to be set back by having the wrong APPS uploaded, "The first hurdle was realizing that the iPads had been loaded with iPod APPS with the accounts that had been set up for use." It was clear that a simple mistake in set up caused a critical error when attempting use for the first time. This unexpected hurdle created a major time set- back by having to reload appropriate iPad APPS.

Participant B was shocked to realize how the learning curve with the technology sent some students into waves of frustration, "Some of the kids in Phys. Ed really didn't like the iPads, they said that they were 'stupid', which really surprised me." Transition time was also noted as an obstacle that was not anticipated. Both study participants made reference to the shocking amount of time that it took students to initiate the use of the iPads and then to organize the devices neatly back onto the cart at the end of the class. Participant B noted that, "I had to be creative in the way in which I organized this to minimize lost time."

#### 4.4 Problem solving

In terms of individualization, both participants eventually labeled all iPads to prevent accounts and profiles being erased or destroyed. Participant A, “So far it looks like each student will have to use a specific iPad, which is difficult as the iPads are not labeled. So, step number 1 for us is to label the iPads.” Participant B also makes notes of working with the account setting and profile concerns, stating,

Changing profiles and deleting work has, and is still something we keep an eye on. Since the iPads are numbered, we keep the students accountable when they do delete items. These are the students that will lose their technology privileges. When another teacher was working on a long term video project with her dance class, she had her computer open and a folder system set up where students would back up their work by transferring videos if needed.

A solution to the transition time issue was proposed by Participant B, “Transition time was a learning curve. I make sure I pack up at least 10 minutes early, before the bell, for the students to sign back in the iPads. The last thing that I wanted was for the bell to ring, students leave, and iPads are missing.”

Any concerns around charging, loading and storage of the devices were quickly addressed with the knowledge of the Apple Cart. Participant B explained her process with the devices, “We have an Apple Cart that stores and charges our class set of iPads. We are also able to upload new apps to the iPads through the case and our Mac Book. We have a sign-out binder that we use between our physical education classes (grades 9-12 shared among 10 teachers, but this does not indicate that each class uses them). The iPads are labeled 1-20 so a student will simply sign one out at the start of the lesson and then sign it back in at the end.”

The use of music on the mobile devices was a popular choice with Physical Education as students enjoyed being able to work out listening to music. There were concerns about students building their own playlists due to the content that they may select. Participant B had a solution for that concern, “We have a few songs on each iPod but generally we do not have students tuning into their own playlist. I do like the option of Songza for differentiation.”

#### **4.5 Successful lesson or moment with the iPads**

Most success stories that the study participants described came from finding APPS that met the needs of the students. Participant B, “If you have not tried skill analysis APPS, such as Coaches Eye or Ubersense, then that is a must try”. Participant A, “Had a great idea to add Songza, so all students can choose their own music to listen to in the weight room. Now that I can update the apps on each iPad relatively quickly, thought this would be awesome.”

#### **4.6 Training effect or personal comfort level**

It is evident that personal interest and a natural comfort level with the mobile technology are just as effective, if not more, than any specific training or Professional Development one can offer in terms of ease of integration. Participant B, “Being comfortable with an iPod beforehand made it easier. Transferring paid APPS to 20 iPods took time, but now it’s pretty straightforward.” Also supporting the idea that personal interest in technology will assist in the integration of mobile devices into a classroom setting, Participant A said, “ I have taken one PD session on iPads in the classroom, but didn't really get a ton out of it. My own personal use from using Apple products prepared me the most for the implication of iPads in the classroom, to the point where I'd like to write my own Itextbook for volleyball”.

#### **4.7 How has the experience affected your teaching perspective around the integration of mobile devices?**

It is clear that this project has demonstrated numerous positive experiences for teachers and students using technology in the classroom. Study participants are eager to seek more opportunity for technology use in their teaching practices. Participant A states, “I will continue to try and use mobile technology in the classroom”. Participant B explains,

Using iPods in the classroom has changed the way I approach certain topics. Technology allows me to offer students the ability to explore a topic instead of me giving direct instruction about the topic. I find that students are far more engaged in the style of pedagogy, yet the end result is the same. In our school the portability of the iPod simply removes the barrier of logistics.

This statement not only supports the idea that mobile devices provide accessibility through the mobility of the technology, but that the devices also construct a model of a student- centred learning environment.

An interesting contrast regarding teacher pedagogy evolved through discussions around teacher beliefs and the effects that the integration of technology has on curriculum. The principal investigator proposed the following questions, “What are your thoughts about the potential change in curriculum with the increased use of technology? Due to the capabilities of the iPads, and their endless resources, do you feel that deeper understanding of concepts will no longer be the responsibility of the student? Is there a cost to teaching and learning with the integration of technology?” Two different perspectives were evident with each study participant’s response. Participant A, “It’s interesting to talk about how easy some of the APPS can make things, but how it almost feels like cheating. Obviously you want the students to have an understanding of what they are doing, but at what cost?” Participant B said,

This topic of conversation is interesting. The thought of technology eroding critical thinking skills, or the opportunities for our students to think critically is problematic. In the PE classroom, I have seen APPS, such as Coaches Eye, make skill analysis more accessible. My students now have the opportunity to see what I see, and create video/narration analysis that they would not do before. If anything, they have created a richer end product by using technology.

Both perspectives are valid; however, one feels that the mobile devices may minimize critical thinking skills, while the other perception is that the technology can only enhance and create a richer learning experience.

#### **4.8 iPads in future classrooms**

The success for teachers and students using the iPads in the Physical Education class is evident. Both study participants hope to see more opportunity for using mobile devices in the Physical Education classes of the future. Participant A states, “I really hope the school replaces its traditional computer labs with mobile iPad labs. The iPad is so much more user friendly than a laptop or PC”. Participant B seems to agree, stating,

We have already set forth how we can further integrate the iPads in the Physical Education classroom for next year with the focus on goal setting and descriptive feedback. With more teachers now on board, and comfortable with the use of the iPad, we are creating a solid network where we can create new ideas and projects, and refine existing ones.

#### **4.9 Consolidation**

In the beginning, the plan of integration looked very different after the iPads were in the building and in the hands of the students. The reality of the iPads being used created many questions and problem solving opportunities. For instance, one study participant needed to quickly resolve a situation requiring moving the iPad cart up a flight of stairs, while the elevator was broken, with a 5 minute turn-around time between classes. The integration plan was

required to be fluid at that point, and all participants shifted into a more flexible process plan. It all seemed so clear until the technology was put in front of us. This is a classic case of the benefits of hands- on learning (Schon, 1987).

Participants worked through challenges and problem solved along the way. Connectivity and account setting issues were solved by the study participants communicating with each other through the Social Network Site, NING, and discussing successful integration tactics such as the use of an Apple Cart and the awareness of appropriate APPS for their classes. A common thread to the success of the problem solving process was the teachers themselves. Both teachers take initiative and are problem solvers by nature. This lends to the connection of teachers' beliefs having a positive impact on the successful integration of the mobile devices.

It was evident that the most effective environment for the integration of the iPads was one where the teacher possessed a natural interest and comfort level with the technology. This was compared to the effect of past training or Professional Development had on the success of the integration. It was clear that personal experience and ease with the iPads resulted in more successful use for both teaching and learning with the technology. Again, this would support the idea that adoption of technology is directly affected by the teacher's beliefs and perspectives. If the teacher does not like or feel comfortable with the device, then it most likely will have resistance when being implemented.

Teacher beliefs and pedagogy were brought to the surface of discussion again when integration of technology at what cost was debated. The two sides of thought were both valid; one expressing that the integration of mobile devices is going to erode critical thinking skills of

students, and the other articulating that mobile devices can only create a richer learning environment.

The two study participants have clearly indicated that there are teachers that believe in the benefits of the use of iPads in a classroom and would like to see mobile devices available in classrooms of the future.

## **5.0 Discussion**

The following discussion attempts to connect the study's findings back to the literature and help answer the proposed research questions: What are the effects that the mobile devices have on student engagement for the required course work? What factors impact the teacher's planning for and use of the mobile devices?

### **5.1 Introduction to the iPads and primary challenges**

This study discusses the positive effects iPads have on student engagement and what successful integration of the mobile devices looks like. However, not all in education see the benefits and there are resistors and barriers to the adoption of technology into classrooms of today.

Ertmer and Park (2007) theorize the difference between external and internal barriers in that external, or first-order, barriers include a lack of access to technology, planning time, or administrative support. In this study, connectivity, security blocks, and drastic network inconsistency throughout the building are all examples of what the study participants described as external challenges with their iPad experience. For instance, it was noted that the iPads connected with ease to the wireless network in the portables but had issues making connections

in the weight room. As Ertmer and Park state, external barriers are easier to recognize and often have a clearer pathway for problem solving. These external issues are not directly related to the actual iPads themselves, but rather a peripheral issue that needs to be addressed at another level.

Transportation, damage control and transition time were further external barriers that were of concern in this study. One of the teachers noted that not being situated in his own class all day, and moving the large cart back and forth to classes was added stress to the implementation process, especially when second level classrooms were involved and the elevator was not working. Damage control was an ongoing challenge and fear for the study participants. Not only with the concern of damage while transporting the devices, but both teachers were nervous about harm to the iPads being used where there was vigorous activity and movement leading to more exposure of mishaps. Both study participants were shocked with amount of time that it took students to initiate the use of the iPads and then to organize the devices neatly back onto the cart at the end of the class. An external barrier easily resolved, Participant B noted that, "I simply had to be creative in the way in which I organized this to minimize lost time."

In addition, study participants proposed that the cost of APPS would be classified as a concern or external barrier. The participants described that there exists an endless variety of APPS creating an abundance of resources; however, they expressed cost as factor that could create resistance to the integration process. One could consider this an easy to resolve issue, again connecting to the literature by Ertmer and Park, stating the fact that these external barriers here are classified as first-order, which are considered easier to acknowledge and solve leading to a smoother the integration of the iPads into the classroom.

One of the more significant external – barriers noted by study participants were associated with account settings. Both teachers discussed moments of frustration having multiple users on a single iPads, as the workout designs were being deleted and merged each time the device was activated by a different user. In terms of identifying the iPads, both participants eventually labeled all iPads, and discussed discipline with students who were not respecting the technology, to prevent accounts and profiles being erased or destroyed. As external barriers are easier to recognize and overcome, once an understanding of the individualization required by the iPads and account settings was realized, iPads were reset accordingly and this external barrier was quickly resolved. In addition, through labeling the iPads and looking at new classroom management techniques, the teachers demonstrated more efficiency in the implementation of the mobile technology.

Internal, or second-order, barriers relate to teachers' beliefs about instructional technology, preferred teaching methodologies, and willingness to make changes to classroom practices (Ertmer & Park, 2007). In this study, time on task was specified as an internal barrier in that there was an ongoing challenge for the teacher participants to see work completion from the students as the novelty of the devices created ongoing curiosity, distracting students from the task at hand. Teacher participants initially felt that students were playing with the devices and wasting valuable learning time as opposed to completing the required course work. Participant A noted,

The students get blinders on once they have the iPads; it is difficult to get them back on track when I'm trying to give instruction and they also are playing with other apps and the camera on a consistent basis so it is hard to track to see who is on task.

Over a short period of time, the teachers realized that the students were just engaged in a different way, more so in the novelty of the iPad. One of the study participants noted,

“Seeing the students get excited over new technology and simply wanting to play and take pictures of themselves made me realize that some students do not have access to this technology at home, so interacting with it as school is a new experience.”

Linking Ertmer and Park (2007), here the teacher seems to make the connection that a change in teaching perspective is what could be needed for a smoother transition of the adoption of the technology. Understanding that the student needs time to digest the new tool in their learning environment and being willing to make changes to classroom practices will assist in overcoming this type of internal barrier. It is clear that as teachers adopt technology, classroom management in a digital world also needs to be augmented. Participant B expresses evidence of the success with this issue, “As we continued, we found it was less of an issue because the technology was not as ‘new’ and it became more of a tool than a toy.” This clearly states that the adoption of technology takes time and that both the student and the teacher need this time to work through the learning curve of the implementation.

## **5.2 Engagement**

The use of mobile technology, specifically iPads in Physical Education, can meet the requirements to inspire the youth of today in a learning environment, in turn providing healthy lifestyle knowledge that can be applied in everyday life. Watterson (2012) claims that by defining the needs of today’s adolescents, the teacher and student interaction can be improved and create a better link to the student’s enjoyment of a healthy lifestyle.

An iPad can be used as a key tool for learning when a student is struggling with a concept. A video or electronic version of an assessment provides students with the luxury of

being able to review the correction as many times as required for further clarification, the mobility provides students a classroom without walls, and the endless resources and media create an entertaining learning experience. Study participants expressed in particular, the media portion of the mobile device to be a valuable in motivating many students. The use of music on the mobile devices was a popular choice with Physical Education as students enjoyed being able to work out listening to music. One participant made note of concerns about students building their own playlists due to the content that they may select. Participant B speaks to a solution for the concern of student choice of music, “We have a few songs on each iPOD but generally we do not have students tuning into their own playlist. I do like the option of Songza for differentiation.” It is evident here that the teacher teaches the student to use the technology responsibly instead of preventing use altogether.

Achrazoglou et al. (2013) further expresses other benefits of iPads describing how they can assist with students and teachers being able to communicate diverse ways. It is evident that students all learn in different ways and it can be seen that the iPads can bring this diverse population of students together to learn. Milman (2012) discusses differentiating instruction. With the differentiated instruction that iPads provide, there are endless resources across the curriculum for all levels of students. One study participant claimed that on several occasions he found that students who were not generally involved in classroom question and answer discussion, were more than articulate when the mobile devices were in use.

“Accessibility, engagement, and mobility are very important to both student and teachers.” (Achrazoglou et al., 2013, para.11). It is clear that the mobility of the iPads do not require a student to relocate to a computer lab, and that they replace paper books as students can download literature for free instantly. One study participant noted that, “The portability of the

iPod simply removes the barrier of logistics of using the technology.” This statement supports the idea that mobile devices provide accessibility through the mobility of the technology.

In addition to academic benefits, Achrazoglou et al. (2013) bring forward the impact that iPads have on the classroom through self-esteem and relationship building, and this is a significant factor to acknowledge in a Physical Education classroom. There is evidence that the fact that students feel empowered by the responsibility of being trusted with such a device, leads to improved relations with the teacher, and potentially the student being more productive with the iPad both in and out of the classroom. Both learning theories, constructivism and situated cognition, support this concept around self-esteem, in that iPads can be employed as a constructivist type tool if students are familiar with them using them for social media or entertainment, they can apply the devices in a learning environment such as Physical Education where social interaction is often a big part of the learning process. As well, the comfort level of the students using the familiar tools can make learning about sometimes sensitive topics in Physical Education a little easier. Situated cognition theory reiterates this in that learning in an environment of familiarity breeds confidence and students will be motivated to take more risks having a positive impact on student learning

It is clear that motivation and enhanced engagement can be a result of the use of iPads in a classroom; however, choosing the right APP is critical. Some applications can inspire students to learn and achieve more than others. Achrazoglou et al. (2013) list the endless tools that the iPad offers Physical Education classes providing stopwatches and data collectors including nutrition tracking APPS making for a more efficient, student-centered learning environment. Most success stories that the study participants describe come from finding APPS that meet the needs of the students. Participant B, “If you have not tried skill analysis APPS, such as Coaches

Eye or Ubersense, then that is a must try.” In addition to using the appropriate APP to stimulate learning, the content and curriculum need also to be fitting. Beattey Johnston and Stoll (2011) highlight that classrooms making the most of iPads tend to present in mathematics and science areas of the curriculum and that the reasons may have to do with the point on the evolutionary hierarchy the iPad currently occupies. Science courses cover content that a student can manipulate and create (Beattey Johnston & Stoll, 2011). This makes the connection that iPads can be an effective tool with Physical Education curriculum covering material dealing with both movement and science. Beagle (2012) draws attention to the benefits of an iPad's motion sensor allowing students to manipulate using their hands in guiding the iPad then being able to measure levels of exertion, balance, and repetitions and that the iPad provides opportunities for instant note taking, documentation and instant response to questions. With the use of the iPads, study participants were able to provide students the opportunities to capture video for use in motor skill learning and biomechanical analysis. One can conclude that iPads are beneficial to learning in a Physical Education class when material can be manipulated and the appropriate APP is being used.

### **5.3 Professional Development VS Personal Interest and Experience**

It seems evident in this study that personal interest and a natural comfort level with the mobile technology is just as effective, if not more, than any Professional Development or training can offer in terms of ease of integration. One of the teacher participants noted that her personal comfort level with the iPads provided her the knowledge required to transfer paid APPS more easily. Also supporting this link to personal interest of the technology, the other teacher participant expressed that he had actually participated in one Professional Development session focused on iPads in the past, but did not find it very effective in terms of preparing him for

realistic use of the mobile device in his classroom. These findings connect with the views of Mumtaz (2000) regarding characteristics of teachers who successfully integrate technology into their classroom. Mumtaz outlines that teachers who embrace technology in their classrooms tend to have a positive attitude towards technology in general, and also experience student– centered classrooms giving choice and empowering students.

#### **5.4 Teaching perspective and pedagogy**

As stated by Park and Ertmer (2007), training and access are no longer measured as significant barriers; currently, teachers' beliefs seem to be the focus of potential influence. Clearly, pedagogy is a critical factor in the adoption of technology process.

The social development theory highlights the More Knowledgeable Other or MKO concept. This study connects the use of iPads and the MKO supporting the concept of a Flipped Classroom, where there is a shift to a student-centered classroom and the student plays a more active role. Park and Ertmer (2007) would support this theory being connected to the use of iPads stating that engaging students in inquiry-based activities and collaborating with peers at a distance tend to be associated with student-centered, or constructivist, practices. One study participant indicated that using iPads in the classroom has changed the way she approaches certain topics and that the technology allows her to offer students the ability to explore a topic instead of it being completely teacher -directed instruction about the topic. The teacher participant shows the release of control in her role to then empower the student and allow them to feel control and ownership of their learning. This allows the teacher to collaborate and facilitate meaning and learning; therefore, it becomes a reciprocal experience for the students and teacher. When students and instructors are partners in the collaborative and informative

assessment process of students' success, research reveals that the result is profound involvement gains for all students" (Achrazoglou et al., 2013, para. 1). It is evident that technology provides independent learning and that teaching students to make decisions on their own, to then apply in the future areas, is the richest form of instruction. The irony in this statement is that the purest and most significant teaching involves the teacher in the background with the student being front and centre driving the learning process. The literature outlines this being one of the most pronounced barriers with the adoption of technology. In Ertmer and Park's (2007) review of the literature, it is argued that in order to shift teachers' practices specifically involving technology it is critical for teachers to open their minds to a more student-centered learning environment as teachers will base their practices on their beliefs (Ertmer & Park, 2007).

The Zone of Proximal Development is an additional aspect to the social development theory and as per Mcleod (2013) this is considered the distance between a student's ability to perform a task under guidance and their ability solving the problem independently. When teachers are able to shift beliefs and relinquish control to provide opportunities for exploration and project-based learning, iPads allow this zone of learning to be uncovered; the students have resources at their fingertips and can work at their own pace, within their own interest, independently. Ertmer and Park (2007) describes problem-based learning as an effective method for shifting teachers' beliefs.

According to Achrazoglou et al., (2013) mobile devices can benefit students' learning by improving skills such as communication, decision making, and raise self-esteem. It is clear that mobile technology offers students a more current learning environment that allows them to feel connected to the classroom and curriculum. As a student learns independently they can also be gaining confidence, which in turn can create more learning opportunities as the student may feel

safer to take risks that can be associated with learning. iPads can be seen as having indirect impact on student engagement by providing a sense of control and ownership of learning which in turn can inspire students to succeed due to internal pride and motivation. It clearly appears that teachers' personal values have an effect on how curriculum is delivered in classrooms of today and keeping these perspectives in check, guiding teacher beliefs in the direction that is needed for a positive school culture, will assist in shaping a school's community. "It's [the iPad] a tool, like any other, and in the classroom it must always be thought of as being in the service of pedagogy. The pedagogical foundations must be solid, because the tool will achieve no heights the underlying pedagogy will not support" (Beattey Johnston and Stoll, 2011, para. 9).

Teacher beliefs around technology can vary from classroom to classroom and even contrast with regards to the effect the technology has on the curriculum itself. This study revealed an interesting debate between study participants when the principal investigator proposed questions to them regarding their thoughts of potential changes in curriculum with the increased use of technology and, due to the capabilities of the iPads, and their endless resources, how this might impact student cognition. The debate that evolved was around the cost to teaching and learning with the integration of technology. Both perspectives are valid; however, one feels that the mobile devices may minimalize critical thinking skills, while the other perception is that the technology can only enhance and create a richer learning experience. Beattey Johnston and Stoll (2011) express the fact that the iPad most definitely has more effective application in some pedagogical situations than others. The success of the adoption of mobile technology is directly related to the individual teacher in charge of the classroom.

### **5.5 iPads in future classrooms**

It is evident that this project has brought about positive experiences with technology in the classroom. Study participants are eager to seek more opportunity for technology use in their teaching practices. Both teachers indicate an attempt to continue the use of mobile technology in their classrooms and expressed that they hope to see more prospects for technologies throughout their schools. In particular, one teacher would like to see the school replace its traditional computer labs with a mobile iPad lab indicating that the iPads are just that much more user friendly than a laptop or PC. Also, this teacher feels so comfortable with the idea of adopting technology, and has a personal passion for mobile devices, that he would be interested in writing his own iTextbook for volleyball. This not only indicates tremendous growth, but demonstrates that the teacher has become a chooser and creator of resources needed for specific uses in Physical Education.

The other teacher feels that she has already set forth how to further integrate the technology in the Physical Education classroom for the upcoming school year with the focus on goal setting and descriptive feedback. It is clear that with more teachers engaged, and comfortable with the use of mobile devices, we are creating a solid network where new ideas and projects can be revealed.

## 6.0 Conclusions and Recommendations

This study attempts to answer questions relating to iPads affecting student engagement in Physical Education classes, and what factors affect the integration of iPads being used in classrooms. Through this investigation, many interesting facts and ideas around the use of mobile technology in classrooms are revealed. Highlighted here are some of the more significant findings.

The literature and findings of this study discovered that personal interest and a natural comfort level with technology impact how and if technology is used within a classroom. This study finds that natural awareness and interest with mobile technology appears to be just as effective, if not more, than what a professional development or training can offer in terms of ease of integration. This supports the idea that how technology is integrated into the classroom is connected to teacher values and beliefs. This links to literature stating that access and training are no longer measured as substantial challenges for the integration of mobile devices into classrooms in that, currently, teachers' beliefs seem to be the focus of potential influence. Pedagogy is an important factor in the adoption of technology process. In this study, the teachers decide how and to what the extent technology is used for teaching and learning. It is clear that this is an influential position to be in having the potential control on curriculum delivery and student engagement.

Due to the impact teachers' value systems can have on the integration of technology, the topic of shifting these beliefs was an interwoven concern throughout the study. It is clear that when teachers are able to shift beliefs and relinquish control it provides students the opportunity for independent exploration and project-based learning. iPads can be seen as having indirect impact on student engagement by providing a sense of control and ownership of learning, which

in turn, can inspire students to succeed due to internal pride and motivation. This empowerment allows the students to govern their own learning while the teacher collaborates and facilitates meaning; therefore, it becomes a reciprocal experience for the students and teacher. It is evident that technology provides independent learning and that guiding students to make autonomous decisions, to then have the capabilities to apply knowledge in other areas, is the richest form of instruction and learning. The irony in this statement is that it would seem that the purest and most significant teaching involves the instructor in the background with the student being front and centre driving the learning process.

Revolution of teacher's beliefs is the most significant change that this study finds to be the key to successful integration of mobile devices into learning environments. This study reveals that access and resources are no longer the most substantial barriers to the integration of technology in schools, but rather, the teachers' beliefs and pedagogy are a focus of concern.

The study continued to reveal more impact of teachers' belief sets, in literature expressing the fact that the iPad most definitely has more effective application in some pedagogical situations than others. The findings exposed a debate relating to the capabilities of the iPads, and with their endless resources, as to how this might impact student cognition. The findings were around the cost to learning with the integration of technology, and how one mindset feels that the mobile devices may minimalize critical thinking skills while the other perceives that the technology can only enhance and create a richer learning experience.

Once teachers have adopted the idea of the use of mobile devices, this study revealed additional concerns for integration of the iPads. It was evident that not only was the appropriate APP required for successful use of the iPads, but content and curriculum need also to be fitting.

It was indicated that the mathematics and science areas of the curriculum were making most use of the iPads due to the evolutionary hierarchy the iPad currently occupies. It was noted that science and mathematics courses cover content that a student can manipulate, which links to the content of many APPS on the iPad. Physical Education curriculum involves much science and movement based concepts, which makes it an excellent venue for the successful use of the iPad.

This study seems to demonstrate the potential effects and impact that teachers can have on the integration of iPads, and it expresses the many ways that the adoption of technology can be accomplished successfully. It is clear that the results of the data describing the participants' involvement with the iPads reveal positive integration of the mobile technology and a desire for these teachers to see more technology in their future classrooms. The study also covers concerns around why potentially, iPads are not being utilized for teaching and learning to their maximum potential. However, the future of the iPad and its use in impending classrooms is not fully articulated in this study. It is evident that there are iPads in schools being employed to engage and motivate students. In addition, it is clear that there exist barriers and resistors to the integration of iPads that are being addressed and that progress is being made for resolution. However, the question still remains as to what educators should do from the current status of adoption of technology to teaching practice. One can conclude that a solid network, literature and an effective model of the successful use iPads in classrooms of the future is necessary for the evolution of the integration of the mobile devices to continue. It is clear that just as technology continues to progress, so must the adoption process.

## References

- Achrazoglou, J., Bills, D., Ochola, E., Stachowiak, J. (2013). Learning Environments and Rapidly Evolving Handheld Technologies. *First Monday, Peer -reviewed journal on the internet*, 18, 4-1. Retrieved from <http://firstmonday.org/ojs/index.php/fm/article/view/3932/3643>
- Active Healthy Kids Canada. (2012). Is Active Play Extinct. Active Healthy Kids Canada Report Card on Physical Activity for Children and Youth. Retrieved from <http://dvqdas9jty7g6.cloudfront.net/reportcards2012/AHKC%202012%20%20Report%20Card%20Short%20Form%20-%20FINAL.pdf>
- Beagle, M. (2012). What Are You "APP" To Do?. *p.e.links4u, promoting active and healthy lifestyles*. Retrieved from [http://www.pelinks4u.org/articles/beagle5\\_2012.htm](http://www.pelinks4u.org/articles/beagle5_2012.htm)
- Beattey Johnston, H., Stoll, C. (2011). It's the Pedagogy, Stupid: Lessons from an iPad Lending Program. *eLearn Magazine, Education and Technology in perspective*. Retrieved From <http://elearnmag.acm.org/archive.cfm?aid=1999656>
- Burr, V. (2007). Constructivism . *Encyclopedia of Social Science Research Methods*, Sage Reference, 186-187.
- Butler, D., Sellbom, M. (2002). Barriers to Adopting Technology for Teaching and Learning. *Educause Quarterly*. Retrieved from <http://cmappublic3.ihmc.us/rid=1KC10V38V-C21PMVGG/Barriers%20To%20Technology.pdf>
- Cresswell, J. (2012). *Educational research: planning, conducting and evaluating quantitative And qualitative research*. (4<sup>th</sup> ed.). Boston (MA): Pearson
- Cresswell, J. (2013). *Qualitative inquiry and research design: choosing among five approaches*. (3<sup>rd</sup> ed.). USA: Sage
- Ertmer, P., Park, S.H. (2007). Impact of Problem-Based Learning (PBL) on Teachers' Beliefs

- Regarding Technology Use. *Journal of Research on Technology in Education*, 40(2), 247–267.
- Frankish, J., Milligan, D., Reid, C. (1998). A Review Of Relationships Between Active Living and Determinants Of Health. *Soc. Sci. Med.*, 47(3), 287-301.
- Kearsley, G., Schneiderman, B. (1999). Engagement Theory: A framework for technology-based teaching and learning. Retrieved from <http://home.sprynet.com/~gkearsley/engage.htm>
- Larson, E., Bruce, R. (1987). Health Benefits of Exercise in an Aging Society. *Arch Intern Med.*, 147(2), 353-356.
- Madden, M., Lenhart, A., Duggan, M., Cortesi, S., Gasser, U. (2013). Teens and Technology. *Pew Internet and American Life Project*. Retrieved from <http://www.pewinternet.org/Reports/2013/Teens-and-Tech.aspx>
- Manuguerra, M., Petocz, P. (2011). Promoting Student Engagement by Integrating New Technology into Tertiary Education: The Role of the iPad. *Asian Social Science*, 7(11).
- McLeod, S. (2013). Lev Vygotsky. SimplePsychology. Retrieved from <http://www.simplypsychology.org/vygotsky.html>
- Milman, N. (2012). iPads in a PreK 4th Independent School Year Enhancing Engagement, Collaboration, and Differentiation across Content Areas. *International Society For Technology In Education Conference*. San Diego, CA., George Washington University.
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education*, 9(3), 319-342, DOI: 10.1080/14759390000200096.

<http://dx.doi.org/10.1080/14759390000200096>

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5).

Schön, D.(1987). A review of *Educating the Reflective Practitioner*. Jossey-Bass , San Francisco, CA.

Smith, E., Semin, G.(2007). Situated Social Cognition. *Current Directions in Psychological Science*, Sage Publications , 16( 3), 133 of 132-135.

Watterson, T.A. (2012). Changes in attitudes and behaviours toward physical activity, nutrition and social support for middle school students using the AFIT APP as a supplement to instruction in a physical education class. *Scholar Commons*, Graduate School Theses and Dissertations, Graduate School, University of South FL.

Wikipedia. Constructivism. Retrieved from

[http://en.wikipedia.org/wiki/Constructivism\\_%28philosophy\\_of\\_education%29](http://en.wikipedia.org/wiki/Constructivism_%28philosophy_of_education%29)

Wikipedia. Situated cognition theory. Retrieved from

[http://en.wikipedia.org/wiki/Situated\\_cognition](http://en.wikipedia.org/wiki/Situated_cognition)

## Appendices

## APPENDIX A

**Initial Survey on *SURVEY MONKEY*****The Effects of Using iPads in a Secondary Physical Education Class**

Please take 20 minutes to complete this survey. The survey will assist with gaining insight into past technology experiences.

Name of Participant: \_\_\_\_\_

Survey Question	Answer
1. What is your teaching experience?	
2. What is your second teaching discipline?	
3. Do you have access to technology to use in you classroom?	
4. Have you attended PD on using technology in a classroom? If yes, briefly describe.	
5. Are you currently teaching students with the use of technology?	
6. If you answered No, please state a reason why.	

7.	If you answered Yes, please state how many years you have been using technology in your classroom.	
8.	If you answered Yes, please rate (1-10) your success rate in terms of gaining student engagement with the use of technology in a classroom	
9.	Do you use technology for personal use?	
10.	How would you rate (1-10) your work environment/ colleagues, in terms of being technically literate?	

Thank you for taking the time to respond to this brief survey.

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### NING Social Network Site Journals

Principal Investigator's sample discussion questions:

What have been the "hurdles" that you have come across and how did you get over them?

Did you manage to label the iPads? If so, has that improved students' ability to build upon their personal workouts having consistency with the same device?

What ideas do you have with regards to monitoring the students and maintaining focus on the course work?

In terms of damage control, what specifically are your concerns?

Are there any new APPS that you've come across in the last few days??

In comparison to the iPads' time factor, I wonder if textbooks were ever considered time consuming when sets first came out to be distributed into classes? Labeling, recording, storage, shifting and replacing typical textbooks for damage all come with time as a cost. How can you compare these two scenarios of resources?

How do you see the increased demand of wifi sending the issues with connectivity in the right direction, as more mobile devices are being used?

What are your thoughts about the potential change in curriculum with the increased use of technology? An easy example, iPads and other technologies can eliminate the need for some curriculum in mathematics. The deeper understanding of the concept is not necessarily the responsibility of the student when the ipads can be used as a resource to solve problems. We paralleled this with the integration of the calculator years ago, and

how some educators' pedagogy was challenged. Is there a cost to teaching and learning with the integration of technology?

### **NING Social Network Site Final Reflective Summary**

Principal Investigator's guiding questions:

- 1) What do you feel was your biggest challenge? What was the biggest challenge for the students?
- 2) What was your most surprising obstacle?
- 3) What did problem solving look like? Was there a resource network of people in your school community?
- 4) Describe a successful lesson or moment with the iPads
- 5) How has your training or professional development affected your experience with the iPads?
- 6) How the experience has affected your teaching perspective and pedagogy?
- 7) With firsthand experience using iPads in the classroom, has your view of integrating mobile devices into a classroom been altered? What are your ideas about incorporating technology in your future pedagogy?

### Learning Theories



