

AERA 2014 submission

[Working title] (How can we successfully adopt 1:1 tablets...or iPads? What makes it successful?)

[Preferred session format – Paper session...possible round table?]

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Paper submission: 2,000 words or less

Graphs, tables, references, etc. do not count to the word count

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#### Abstract

When adopting a new technology initiative in a school district, there is much that goes on behind the scenes aside from presenting the students or teachers with the device. Countless hours of preparation, planning, and development occur before the technology is introduced into the school. While school districts across the country adopt iPads and tablets in 1:1 initiatives, new challenges, issues, and approaches are discovered as these initiatives are implemented. This paper explores how one school has successfully implemented such an initiative at the kindergarten level, focusing on the planning and support at the classroom, school, and district levels.

#### Purpose

The purpose of this paper is to document the struggles and successes of a district-wide 1:1 iPad initiatives. This includes an examination of the roles of the different stakeholders (teachers, principals, technicians, professional development support) within the initiative, the policies set in place by the district, and the data that guided district decisions.

#### Theoretical Framework

Many school districts across the United States have invested in 1:1 initiatives in order to offer each student the opportunity to use technology on a daily basis (Penuel, 2006; Garthwait and Weller, 2005). In the last decade, this primarily focused on laptop/netbooks. However, with the emerging trend of substituting these laptops/netbooks for tablet devices, such as the Apple iPad, more schools have started to incorporate. District-wide adoption of 1:1 laptops typically found issues with hardware support such as wireless infrastructure, security, professional development, and funding issues due to mixed results regarding effectiveness. With district-wide iPad initiatives, many of these same concerns remain, with the addition of an overabundance of applications available.

There have been several reports discussing how young children are able to use and utilize iPad and technology devices (Henderson and Yeow, 2012; Sandvik, Smørødal, and Østerund, 2012; Zaranis, Kalogiannakis, and Papadakis, 2013). These technology devices may be excellent educational solutions for younger students, especially those in kindergarten. Kindergarten students have a wide range of

knowledge and skill levels (Seefeldt, 1990). Due to this wide range, teachers need to have access to a range of tools and strategies that allow for differentiated instruction. Computer technologies, and mobile technologies in particular, allow for learning to be more personalized and configured towards the individual needs of the student (Traxler, 2007). In particular, the use of these tablets allow for learning to meet several different learning styles, including tactile (through use of the touch screen), and audio-visual styles, and allow for repetition and immediate feedback on knowledge and skill acquisition (Attard and Curry, 2012). In particular, some have reported that these devices can impact both literacy and language acquisition (Sandvik, Smørðal, and Østerund, 2012), as well as mathematics skills acquisition (Zaranis, Kalogiannakis, and Papadakis, 2013). A 1:1 iPad initiative at the kindergarten level has the potential to impact students' literacy and math skills through differentiated and personalized instruction.

The overlying structure of implementing such an initiative can be seen as similar to that of a 1:1 laptop/netbook initiative, with key differences based on content and management at the various levels (e.g., administrative level for funding, technology support demands, and professional development needs). While there are many examples of implementation studies for the laptop/netbook initiatives (Penual, 2006), few have focused on the adoption of tablets. However, the overarching themes in terms of adoption and support remain constant, focusing on the importance of teacher buy-in, professional development opportunities, administrative support, and technical support (Penual, 2006; Garthwait and Weller, 2005). Furthermore, hardware considerations for adequate usage of the device, such as the establishment of a wireless network and device charging and security must be prepared for to maximize the device as a learning tool (Cauldill, 2007).

### Methods

To explore the adoption and management of a district-wide 1:1 iPad initiative, the researchers used a descriptive single case study (Yin, 2003). Data collection used three primary sources to triangulate and verify consistency of data: observations, interviews, and document searches/reviews (Bebell & Kay, 2010).

The school district was located in a suburb in the midwest and has been recognized at the local, state, and national level for their integration of technology. This district was selected because of this recognition, as well a research partnership status between the district and the research institution.

To examine how the devices were used and managed at the classroom level, the researchers observed iPad classroom activities in seven out of 19 kindergarten classrooms in the school district. Observations occurred during a normal school day for hour-long segments in each classroom. During these observations, multiple researchers took detailed field notes, which were later compared, compiled, and a final set of notes agreed upon by the research team. The field notes included detailed observations of student actions and discussions, teacher actions, classroom layout, structure of the activities, and informal discussions with the teachers. A thematic analysis was performed for each classroom observation to identify trends among the different classrooms (Boyatzis, 1998).

Twelve interviews were conducted focusing on the four main stakeholder groups of the kindergarten iPad initiative: seven kindergarten teachers, three administrators (two principals, one

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technology administrator), one professional development support personnel, and one technology support personnel. The interviews were digitally recorded and later transcribed. A thematic analysis was performed to identify common themes, ideas, and concerns across the groups, as well as across all stakeholder groups to explore the consistency of understanding the iPad initiative (Boyatzis, 1998). Teacher interviews, which were performed after the classroom observation, served as a member check to ensure consistency of information or identify conflicting ideas.

Documents collected and examined for this research project included permission slips sent home to parents, grant information used to fund the initial step of this project, and AIMSweb reporting data, published by the school district.

The researchers also participated in the district-run conference related to the iPad initiative. During this conference, teachers presented their strategies and lessons learned during the implementation of the initiative to teachers within and from outside of the district. Conference sessions ranged from reflections to classroom strategies and activities found most effective and engaging by the presenter.

After data was collected and analyzed, it was presented in the form of a summary to the Director of Technology of the district as a final member [check](#).

#### Preliminary Results

The 1:1 iPad initiative at the selected school is focused on the early elementary education program (by the 2013-2014 school year, it will consist of the kindergarten – 2<sup>nd</sup> grade levels), with the end goal of allowing for students to have access to a personal technology device throughout their entire school career (K-2 iPad, 3-8 netbook, 9 – 12 iPad). This supports the school corporation's technology mission statement, focusing on "personalized, individualized, and differentiated tools and [to] ensure that teachers utilize these features to maximize the support to students at their own interests and levels" (Author, 2012).

Beginning as a pilot program in 6 kindergarten classrooms 2011, the program has grown across grade levels and schools within the district. As early adopters of the 1:1 iPad initiative, this volunteer pilot group of teachers, along with the technology support team, professional development team, and administrative team, has grown into a model for others wishing to implement and manage similar initiatives. Several school districts in the same state have approached and observe the manner of adoption and diffusion of the initiative, as well as how teachers are using the iPad for early elementary students.

There are three supportive teams that help support the initiative and teachers: technology support team, professional development team, and administrative team. The technology support team consists of two technicians, who perform device, server, and network support tasks. The professional development team consists of two instructional support specialists, who manage professional development training opportunities, as well as the yearly school district iPad conference. The administrative team consists of the five elementary principals who supervise and support the teachers, provide professional development opportunities, and provide discretionary funding for app purchases. Overseeing and participating in all of these teams is the director of technology. As the director of technology, her role is to work with other administrators (such as the Chief Financial Officer in regards

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to funding), oversee the management of the teams, identify connections between the project and the overall corporation technology plan, and provide opportunities for the teams to share their experiences with other school corporations and professional organizations.

Based on informal data analysis conducted with AIMSweb testing focused on literacy and numeracy assessments over a two year period (Author), as well as anecdotal descriptions by teachers and administrators on the increased reading ability of students at the end of kindergarten compared to previous years, administrators were encouraged to expand the program to the entirety of the kindergarten and first grade classrooms.

Within the first two years, the director of technology and members of all three teams expressed concerns to improve the implementation and management of the iPads. With the increased number of teachers participating in the initiative (increasing from six in the first year to all nineteen kindergarten classrooms in the second year), the teams all found the deployment and management of applications was particularly complex due to the large numbers of apps downloaded by teachers, the frequency of use of these apps, and the time and bandwidth requirements in keeping all of the apps updated. Teachers were given iPads where they could install any applications from the iTunes store they wanted to try before having them installed on the student iPads. This led to a wide variety of apps being installed on the iPads, some of which were used often, others rarely used. During the second year, the professional development team managed this by asking teachers to submit a request for the team to review and approve an app.

Student iPads are managed and updated by the technology support team with a classroom master account, who performed installations and updates by manually updating the iPads using the charging cart, which could take up to a week per school to perform. Bandwidth restrictions during the school day also led to slow updates and app downloads. Due to the scope of the growing project, the technology support team collaborated with other local school districts, finding an alternative solution to enable the automatic rollout of updates and downloads through a mobile device management software called Filewave. The technology team also prepared to address the potential issues of unauthorized content (by using Lightspeed filtering software), substantial damage costs by instead learning quick in-house repair techniques such as fixing a broken screen), or theft (contracts signed by parents and students, as well as using Find My Phone when under 100 devices, and FileWave to trace the IP address of missing iPads)

In order to address the overabundance of applications on the devices, the professional development team has found and implemented a new solution by selecting one representative teacher per school to identify the most relevant and applicable applications used by the teachers in their schools. These representative teachers collaboratively work together to compare and contrast suitable apps, as well as classroom activities, for using the iPads in their classrooms. Kindergarten iPad apps have included Writing Pad, Rainbow Sentences, and Scribble Press, which focus on essential literacy practice, and Butterfly Math, Monkey Math, and Inigma QR Code Scanner, which focus on repetitive math skill development that provides immediate feedback.

#### Scientific or scholarly significance of the study or work

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This study was significant because it provided an example of the successes and struggles that should be considered when adopting a 1:1 iPad initiative at lower elementary levels. This study sought to provide descriptive examples of the organizational structure of the district in regards to the initiative, perceptions of the individuals implementing it, and a discussion on methods to solve problems which were unanticipated at the beginning of the initiative. While some of the themes are similar to that of a 1:1 laptop or netbook initiative from the past decade, new issues and viewpoints emerged with the adoption of the iPads that other districts planning to implement similar initiatives would benefit from reading).

## References

Author. n.d.

Author. (2012).

Attard, C., and Curry, C. (2012). Exploring the use of iPads to engage young students with mathematics. In J. Dindyal, L. P. Cheng & S. F. Nh (Eds). Proceedings of the 35<sup>th</sup> annual conference of the Mathematics Education Research Group of Australasia: *Expanding horizons*. Singapore: MERGA.

Bebell, D., and Kay, R. (2010). One to One Computing: A Summary of Quantitative Results from the Berkshire Wireless Learning Initiative. *Journal of Technology, Learning, and Assessment*, 9(2).

Boyatzis, R.E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Sage.

Cauldill, J. (2007). The growth of m-Learning and the growth of mobile computing: Parallel developments. *The International Review of Research in Open and Distance Learning*, 8(2).

Garthwait, A., and Weller, H. (2005). A year in the life: Two seventh grade teachers implement one-to-one computing. *Journal of Research on Technology in Education*, (37)4.

Henderson, S., and Yeow, J. (2012, January). iPad in education: A case study of iPad adoption and use in a primary school. In *System Science (HICSS), 2012 45<sup>th</sup> Hawaii International Conference on* (pp.78-87). IEEE.

Penuel, W. (2006). Implementation and effects of one-to-one computing initiatives: A research synthesis. *Journal of Research on Technology in Education*, 38(3).

Sandvik, M., Smørddal, O., and Østerund, S. (2012). Exploring iPads in practitioners' repertoires for language learning and literacy practices in kindergarten. *Nordic Journal of Digital Literacy*, 7(3).

Seefeldt, C. (1990). *Continuing issues in early childhood education*. New York: MacMillan Publishing Company.

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Traxler, J. (2007). Defining, discussing, and evaluating mobile learning: The moving finger writes and having writ...*International Review of Research in Open and Distance Learning*, 8(2).

Yin, R. K.(2003). Applications of case study research (2nd ed.). Thousand Oaks, CA:Sage.

Zaranis, N., Kalogiannakis, M., and Papadakis, S. (2013). Using mobile devices for teaching realistic mathematics in kindergarten education. *Creative Education*, 4(7), 1-10.