

The Effectiveness of iPads to Teach Curriculum Vocabulary

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Part 1: Introduction and Background

Part 2: Literature Review

Part 3: Intervention and Evaluation

Part 4: Executive Summary

Works Cited

Part 1: Introduction and Background

The intent of this research is to evaluate existing research on the relationship between iPad use and acquiring content knowledge, specifically in the area of vocabulary. As discussions about tablets and assistive technology devices occur, the effectiveness of such devices have been called into question. What is the effect of iPads on acquiring new content vocabulary? This review will examine completed research findings and draw conclusions on this relationship.

This question has huge practical implications across the field of education. General education teachers, reading specialists, ESL teachers, special education teachers, and many more deal with the issue of teaching content vocabulary. Personally, as a teacher for the deaf and hard of hearing, I face the issue of teaching content and other vocabulary to my students on a daily basis. I am always searching for better more meaningful ways to teach vocabulary to my students. Since using my personal iPad with students, I believe it has aided in learning and I am now interested on what others have discovered in this area.

One of the main reasons I teach vocabulary directly is due to the lack of incidental learning in students with hearing loss. Incidental learning is the process of children passively absorbing information from the environment which is difficult for children with hearing loss due to the amount of information missed (Doyle, 2002). Melanie Doyle (2002) has experienced first hand, not only through her teaching history and Masters education work but also as a parent of a child who is deaf and hard of hearing. She said that because of the lack of incidental learning, D/HH children miss out on practical knowledge needed to make progress in both the school environment and the community. Children who have a hearing loss will need to be taught directly many of the skills that other children learn incidentally”.

Teachers boast about how large of an impact iPads make for their students. Sara Getting and Karin Swainey (2012) stated that, “iPads truly make a difference in sight word recognition, fluency, comprehension, and vocabulary recognition and meaning” for their first grade reading intervention groups. However, many administrators complain about cost and refuse to approve purchases. In addition, parents take pride in how useful this device can be at home, while teachers struggle to get students to implement them in academically meaningful ways. A conclusion on the relationship between iPads and learning content knowledge could greatly

support justifying the need and success of such technology. What research has been done to show the usefulness of iPads in the classroom, especially on what kind of impact they have on teaching students content vocabulary?

Part 2: Literature Review

Introduction

Topic: *The purpose of this literature review is to evaluate the research that has been done to show the usefulness of iPads in the classroom, especially on what kind of impact they have on students achievement in content vocabulary.* Most research on this topic comes from implementation in the classroom setting and collecting data, thus being conducted mostly by teachers.

Overview: *It is well agreed upon in the research examined that more research and study is needed.* Where one teacher had huge success, another has no success at all, leaving us with inconsistent results. These discrepancies were found when analyzing specific apps, home use, teacher implementation, or achievement on standardized tests.

Rationale: *Due to the specificity of the topic, not all literature examining iPad use was included, only those specifically referencing vocabulary development.* Only literature from reputable sources was included, as determined by familiarity of the institution and reviewed work. The literature presented in this review was obtained through university databases, reputable journals, and google scholar searches.

Review

The following case studies come from a variety of reviewed journals that consider both quantitative and qualitative data for the use of iPads in instruction. Peer-reviewed, and scholarly education research articles were included, though many of these were written by practitioners. Presented first are the cases where academic gains were made due directly to the impact of implementing iPads. Secondly, cases are presented in which gains were not made, or there was a call for further research.

Two first grade teachers, Sara Getting and Karin Swainey, (2012) did a case study in implementing iPads to improve reading achievement and they were able to move 20 students out

of 27 from the bottom two groups up to a higher reading group during the 2010-2011 school year. To specifically target vocabulary they used a variety of iPad apps which allowed them to create games like word cake walk, word mingle, and concentration, which allowed students time to practice with word recognition. In addition, iPads were presented as a privilege to students and were removed when not used appropriately; this led to a 20% average increase of time on task. Through this mix of qualitative and quantitative data they found that iPads were effective with at risk learners and that iPads can “truly made a difference in sight word recognition, fluency, comprehension, and vocabulary recognition and meaning” (2012, p 27).

Jim Harmon, (2012) a sophomore english teacher in Ohio, found that students with iPad access improved their reading and writing ability on average a full grade level above their peers, based on the Measures of Academic Progress benchmark test and felt more engaged in learning. Harmon, through a class set of iPads, had students help choose a variety of apps to support reading, vocabulary, and writing. Specifically, he focused on vocabulary development through game type apps. Through posting high scores in the classroom, competition was created and without encouragement from him, students sought out ways to get a higher score and started to look for opportunities to use their new vocabulary words. This motivation from competition and practice over time led to higher student achievement. Students with iPad access were 6% more likely to pass the reading portion of the 2011 Ohio Graduation Test. In addition, students with iPad access were 8% more likely to pass the writing portion of the 2011 Ohio Graduation Test. Harmon also surveyed his students and found that, in their opinion, iPads created an excitement, engaging, and unique tool that made them feel like they were in control of their learning.

Amy Hutchison, Beth Beschorner, and Denise Schmidt-Drawford (2012) identified the TPACK framework as a key instrument leading to many practical recommendations for curriculum based technology integration. Using this framework to understand iPads impact on literacy instruction, they assert that iPads can help teachers meet the goals of print based literacy, while also having the chance to learn technology literacies. In order to examine this, they chose a fourth grade teacher who expressed wanting to integrate more digital technology into her teaching, and that teacher integrated iPads into her literacy instruction every day for three weeks.

They found that this teacher was able to meet print based literacy goals as well as technology literacy skills through implementing specific applications. One of these applications, Doodle Buddy, allowed students to express their understanding through drawing pictures, which more accurately conveyed their meaning, and then they could be shared with others.

Rodriguez, Strnadova, and Cumming (2014), were able to quantitatively and qualitatively show increased student engagement, improve sentence formation skills, improved expressive and receptive vocabulary, and teachers and students expressed feelings of satisfaction from iPad use in students with disabilities. By measuring the number of prompts students needed to stay on task, they were able to show an increase of engagement through a decreased number of prompts needed. While researching iPad applications, they specifically implemented the app Language Builder, which allows students to practice their word choices by recording sentences they create and can then listen to them. This process lead to improvements in sentence formation and expressive and receptive vocabulary, more so than those who received traditional in-person teaching. In addition, through interviews with both teachers and students there was a high level of satisfaction with using the iPad for language arts instruction.

Meanwhile, Wierson (2013), a sixth grade teacher found no significant gains in vocabulary and comprehension reading skills by implementing the iPad application, Vocabulary Central Grade 6, with 44 sixth-graders. They used the application ten minutes a day over a six week period of time, with expectations that each day they would complete a unit individually. The app provides specific and supportive activities such as interactive flashcards for rote practice, songs that provided context clues to determine word meaning, and trivia games to test your knowledge in a game format. However, Wierson also evaluated the perceptions of sixth-grade students after using the iPad application, and it showed significant student interest in using an iPad to study vocabulary. Overall, Wierson indicated the need for further study concerning the merit of using iPads in the classroom to improve learning.

Francette Broekman (2013) conducted an experiment with 136 toddlers aged two through six to test their memory when information was presented either on the iPad, through a video, or through face-to-face interaction with an adult. Mean scores for the iPad condition were not significantly different from mean scores in the video or face-to-face condition. This

suggests that children between 24 and 76 months learn new words equally well from an iPad, a video, or live interaction with a person. There was no significant difference in performance even when broken down into age group categorization, but iPads did seem to be the ideal tool for students who were four and starting to be active explorers. Broekman concludes that age is a key factor when assessing learning capabilities from different sources, and still believes that the iPad could be a helpful learning tool, because it offers experience to interact with information at the child's own pace, expanding their knowledge through educational games.

Smith, Adams, and Hagood (2013) surveyed four sixth grade teachers whose classes received one-to-one iPads in order to implement literacy instruction and found that only teachers who were already using evidence based practices in teaching vocabulary were able to increase these practices. Teachers who were not already using evidence based practices to teach vocabulary were only able to increase their evidence based practice instruction by one, where teachers who were using evidence based practices prior to implementing iPads were able to increase it by four. A correlation was also found that those teachers who were not able to increase their evidence based practices with the iPads also felt that their technology knowledge was not deep enough, which lead to increased frustration and the need for an extensive amount of more training. These three researchers also called for more research into how teacher effectiveness impacts the implementation of iPads in the classroom.

Two literacy researchers, Joanne O'Mara and Linda Laidlaw (2011), who are also parents of preschool to elementary school aged children evaluated how to "un-domesticate" technologies and translate them into the classroom. In experiences with their own children, they often find that their children will play with the drill and skill activities, like most education apps, initially but very quickly find them boring. They compared this response as being very similar to activities like worksheets, thus they advocate for open ended apps that allow for creativity and pretend play. Within open ended apps, the physical and digital can blur together creating opportunity for language growth and development, when supported by more mature language models. Specifically, they give the example of Toca Tea Party, where their children can have a virtual tea party.

Jordan Sadler (2013), a Speech/Language Pathologist and iPad specialist supports O'Mara and Laidlaw's theories for open ended apps by explaining how much of her clinical work is enhanced by this opportunity to form new language around a pretend game, like Toca Tea Party. This app gives the opportunity to engage in a pretend game focused around what we want to eat and drink, while targeting verbal description, simple sentence building, pronoun use, and negative forms. This use of open ended apps supports O'Mara and Laidlaw's ideas of un-domesticating home technologies and translating them into the classroom or therapy setting.

Conclusion

Overall, there was a very strong theme of an increase in student engagement throughout the studies, but mixed results on curriculum impact. Qualitative surveys and quantitative measurements of increased time on task demonstrated that iPads improved students engagement. However, the main goal of this research was not to find if iPads were engaging, but if they could improve content vocabulary learning. While half of the studies reviewed, were able to show improvement in curriculum learning, the other half, were not. Many calls for further research were made, as it seems many variables are still influencing results. These multiple variables call into question what we should be researching further, the general impact of integrating iPads or if we should be evaluating specific applications and implementations strategies. The research does show that specific apps, like open ended and game based apps, such as the ones used by Sara Getting and Karin Swainey (2012), are better than others, such as Vocabulary Central Grade 6, that Wierson (2013) implemented which showed no significant gains in vocabulary.

Part 3: Intervention and Evaluation

Research Questions: What is the impact of iPads on student achievement on curriculum vocabulary as measured by growth in understanding based on performance on pre and post tests?

Methods/Intervention: A review of the field shows that most research is being implemented on the classroom level, by teachers, with classroom sets of iPads as witnessed by the above mentioned studies from Wierson (2013), Smith, Adams, and Hagood (2013), and Jim Harmon (2012). Many researchers are collecting qualitative data from student surveys about their engagement level when implementing the iPad. However, this study employs quantitative methods to measure if there is increased vocabulary growth when implementing technology

versus traditional paper and pencil methods. Through pre and post testing of vocabulary knowledge, this study will provide quantitative data that will be able to show trends between two distinct set of students. Students will receive vocabulary intervention, one set through traditional means and the other set through the implementation of educreations on the iPads.

Evaluation: To determine the effectiveness of iPads, we will need to evaluate the tools we are using. This study implements the use of the app Educreations Interactive Whiteboard created by Educreations Inc. To evaluate this application or others I would encourage the use of the Educational App Evaluation Rubric created by Tony Vincent (2012). This rubric is broken down into seven evaluation criteria, scaled from ineffective 1 to effective 4. Below is how I rated the application Educreations:

- Relevance: 4, The app's focus has a strong connection to the purpose for the app and appropriate for the student
- Customization: 4, app offers complete flexibility to alter content and settings to meet student needs
- Feedback: 1, the student is not provided feedback
- Thinking Skills: 2, App facilitates the use of mostly lower order thinking skills like understanding and remembering
- Usability: 4, student can launch and operate the app independently
- Engagement: 4, student is highly motivated to use the app
- Sharing: 4, student product is saved in app and can be exported to the teacher or for an audience.

Sample: This study will be implemented in two general education classrooms. One entire classroom would receive traditional instruction, while the second classroom implements iPads. This may be best carried out at the middle school or high school level so that the instruction could be implemented by the same teacher, thus teaching strategies and methodology does not become another variable. For example, a teacher will use one hour 6th grade English class for the iPad implementation and another hour of 6th grade English class for the traditional implementation. The general education classroom is a random sampling of an age specific category that includes a variety of students (male, female, special needs, typical development,

gifted). These circumstances provide the opportunity to collect data that can be generalized to larger populations if a good probability sample has been drawn (Ross, 2015).

Study Design: Quantitative data will be obtained from two groups, one will show vocabulary growth without iPad implementation and the other set will show this growth with iPad implementation. The data can then be compared to identify if differences in growth are evident between the two groups. This study is designed to be implemented by the same teacher for the same subject to remove the variables of different content or teaching practices. This method limits the variables to target the impact of the iPad alone. In addition, using a specific application, Educreations, limits the study but also removes more variables. Without targeting a specific app it is unclear what apps, tools, or strategies helped student learning and does not give us a clear picture of what impact the iPad had as witnessed in Sara Getting and Karin Swainey's study (2012). This study is also designed so that it can be implemented multiple times with different sets of vocabulary to increase the data set and take into account individual experiences of students such as illness or motivation that may influence the data.

Data Sources: Students from both classes will take a pre and post test of a determined set of core vocabulary words from the subject curriculum during a designated intervention time. These scores will be recorded and compared for analysis.

Procedure: Two classes will be selected that are in the same grade level and addressing the same content vocabulary. All students should then participate in a pretest on the determined set of words. Both classes will then practice these set of words for a determined amount of time, both creating something that include the word, the definition, and a sentence using the word. One class will do this traditional, flashcard style, while the other class will implement the use of iPads, using the app Educreations.

Data Analysis: Pre and post test scores will be able to show a percentage of growth. For example if student A had a pre test score of 2/10 which is a 20% then a post test score of 8/10 which is 80%, there was 60% growth ($80\% - 20\% = 60\%$). Each student that participated can be assigned a growth percentage. The two sets of data, one from the traditional instruction and one from the iPad implementation, can be compared to see if more growth occurred for students who had iPads implemented. In addition, you can take the mean, or average of each group then

compare the whole group instead of individuals to look for differences. This testing can then be repeated over multiple sets of vocabulary, for example each unit throughout a semester, to see if a consistent pattern emerges. This will help take into account individual experiences such as illness, and motivation that may influence the analysis.

Part 4: Executive Summary

What is the effect of iPads on acquiring new content vocabulary? Other research has shown we do not yet have an answer to this complex question. Harmon (2012) as well as others have demonstrated success with iPads in vocabulary development. Studies such as this have shown there is a basis for teachers who have seen the implementation of iPads impact student achievement. However, we can not ignore the other studies, such as Wierson's (2013), where no significant gains in vocabulary were measured by implementing the iPad. These studies show that only implementing an iPad will not guarantee growth in student vocabulary. The contrast of studies both prove and disprove the success of iPads. This discrepancy in the data leads us to further questions about the implementation of iPads impact on student growth.

Research thus far leads us to much more research that needs to be conducted to evaluate different elements of iPad implementation that could affect student growth. These elements include but are not limited to specific apps, teaching strategies, environmental context, and frequency/duration of use. Some of these have begun to be explored such as game based apps that Harmon (2012) used, open ended apps Sadler (2013) endorsed, or teachers implementing evidence based practices as Smith, Adams, and Hagood (2013) researched.

All of these different elements are why I have designed a study that is precise. By choosing a specific app, allowing only one teacher to implement, and providing the opportunity for multiple testings across different samples, my study aims to be specific. Choosing a specific app, Educreations, does not leave the researcher wondering what methods, apps or tools were implemented. Educreations allows students to create their own videos centered around vocabulary words and definitions, while including examples of pictures and sentences. However, the setup of this study could allow for more research into other apps which could impact vocabulary acquisition. Only allowing one teacher to implement across multiple classrooms controls the teaching style, practices, and strategies. This could then be used for further research to study

multiple teacher implementing the same exact thing to determine if there are specific strategies that impact further growth. Finally, allowing for multiple testing allows for multiple trials and larger sample sizes. This can improve validity, if you receive the same results over multiple trials.

There is much more research to be done on the implementation of iPads and this study is not designed to answer all the questions. However, multiple controlled specific studies may help us to start gathering the information needed to have truly researched based practices for implementing iPads.

Works Cited

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Doyle, M., & Dye, L. (2002). Mainstreaming the student who is deaf or hard of hearing - hands and voices [PDF]. Retrieved from www.handsandvoices.org/pdf/mainst_cal.pdf

This document comes from a well known and trusted organization within the field of deaf education called Hands and Voices. Hands & Voices is a non-profit, parent-driven organization dedicated to supporting families of children who are deaf or hard of hearing. Even though this is a parent organization, both of the authors have Master's degrees and professional experience in the field of education. This document's purpose is to provide high quality information in understandable language for nonteaching professionals in order to express basic information about the impact hearing loss can have on students. It is imperative to this context because it explains why direct teaching of vocabulary is critical for students with hearing loss to due the lack of incidental learning.

Getting, S., & Swainey K. (August 2012). First graders with iPads? *Learning & Leading with Technology*, 40 (1), 24-27. Retrieved from <http://eric.ed.gov/?id=EJ991227>

This article comes from *Learning & Leading with Technology* published by the International Society for Technology in Education, which is a nonprofit organization serving educators and education leaders committed to empowering connected learners. The authors are two teachers who set out to determine if using iPads would help increase reading achievement with their two lowest reading groups during the 2010-11 academic year at Hilltop Elementary School in Inver Grove Heights, Minnesota, USA. They took on the challenge of improving elementary reading using iPads and found surprising success for their first grade at-risk readers. According to the authors experience, twenty students out of twenty seven from the bottom two groups moved up to a higher reading group during the school year due to the implementation of iPads.

Harmon, J. (2012, June-July). Unlock literacy with iPads. *Learning & Leading with*

Technology, 39 (8), 30-31. Retrieved from

http://go.galegroup.com/ps/i.do?id=GALE%7CA293949206&v=2.1&u=msu__main&it=r&p=AONE&sw=w&asid=351bba102218f3aaa51187b9791809ce

Jim Harmon is a sophomore english teacher at Euclid High School in Ohio. He is also an Apple Distinguished Educator, a Google Certified Teacher, and adjunct instructor at Baldwin-Wallace College. Most of his sophomore students are at least two grade levels below in reading and writing within a school where most students are on free or reduced lunch. He received a class set of iPads from his district and was asked to keep data on the iPad's impact on student achievement. One area he focused on was vocabulary development through game type apps. He would post highs scores in the classroom and used the iPads during enrichment times and after assignment completion. Without encouragement from him, students sought out way to get a higher score and started to look for opportunities to use their new vocabulary words. At the end of the school year, he determined that iPads met his needs as a teacher and met the students' needs as learners. He stated, "The simplicity of the iPad, the uniqueness of its user interface, and the familiarity of design all point to one thing: excitement for learning. No other pedagogical tool or technique in my experience engages students in a way that makes learning fun and leaves students feeling like they are in control of their own learning."

Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of iPad for literacy learning. *The Reading Teacher*, 66 (1), 15-23. doi:10.1002/TRTR.01090

O'Mara, J., & Liadlaw, L. (December 2011). Living in the iworld: Two literacy researchers reflect on the changing texts and literacy practices of childhood. *English Teaching: Practice and Critique*, 10 (2), 149-159. Retrieved from

<http://edlinked.soe.waikato.ac.nz/research/files/etpc/files/2011v10n4nar2.pdf>

This article comes from a journal that is peer-reviewed and aims at encouraging critical reflective practice and classroom-based research. The authors are literacy researchers

who are also parents of preschool to elementary school aged children. They have examined their childrens “out-of-school” influences and engagement with developing forms of digital technologies. Then reflecting on those experiences as to how we could “undomesticate” these technologies and translate them into the classroom. They find that their children will play the “drill and skill” activities, like most education apps, initially but very quickly find them “boring”, very similar to their response to activities like worksheets. Thus they advocate for open ended apps that allow for creativity and pretend play.

Rodriguez, C.D., Strnadova, I., & Cumming, T. (March 2014). Using iPads with students with disabilities: Lessons learned from students, teachers, and parents. *Intervention in School and Clinic, 49 (4), 244-250*. doi:10.1177/1053451213509488

This column provides an overview of a selection of research studies involving mobile devices such as iPads, ideas for classroom implementation, and suggestions to overcome common challenges. All three authors are PhDs from varying universities all over the world. They have highlighted that using the iPad increased the students’ engagement as measured by the number of prompts required to keep the students on task. Teacher and student interviews also revealed high levels of satisfaction with using the iPad for language arts instruction. Also they highlighted a study they have done investigating the impact of the iPad application *Language Builder* on the language skills of 30 students identified with language-based disabilities. Students in the experimental group used the *Language Builder*, an app that focused on the skill of sentence formation, for 30 minutes, 4 days per week. Language skills measured were (a) expressive and receptive vocabulary and (b) sentence formation skills. Students who used the iPad application had greater gains in the area of sentence formation than those students who had teacher-led language instruction. The iPad application was more successful than traditional instruction at increasing the sentence formation skills of the participating students.

Ross, K. (2005, September). Quantitative research methods in educational planning.

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http://www.unesco.org/iiep/PDF/TR_Mods/Qu_Mod1.pdf

Sadler, J. (2013). App review: clinical uses of toca boca apps. Retrieved from

<http://www.jordansadler.net/blog/app-review-clinical-uses-of-toca-boca-apps>

Smith, R.C., Adams, R., & Hagood, M. (2013) Vocabulary instruction without and with iPads. *College of Charleston: School of Education, Health, and Human Performance*.

Retrieved from

http://ehhp.cofc.edu/ncate_2012/documents/Student%20Work%20Examples/MTLA_P12_1.pdf

These three researchers are from the College of Charleston's School of Education. They conducted this study because new technologies, such as the iPad, have moved instruction from a print based delivery model to one that engages learners with digital text and multimedia experiences. This study is organized around the theoretical principle of new literacies and the TPACK framework. They use both of these principles as a lens to examine teacher's reflection of their instructional practice without and with iPads. This study reports, through teacher's reflections, an increase in evidence-based vocabulary practices, and gains in reading and vocabulary. In addition there was an increase of student motivation due to iPad use with instruction.

Vincent, T. (2012, March 4). Ways to Evaluate Educational Apps. Retrieved November 8, 2014, from <http://learninginhand.com/blog/ways-to-evaluate-educational-apps.html>

Wierson, D. A. (2013). Effects of an iPad application on vocabulary and comprehension in a sixth-grade classroom. *Southwest Minnesota State University, ProQuest*

Dissertations and Theses. Retrieved from

<http://ezproxy.msu.edu/login?url=http://search.proquest.com/docview/1449422161?accountid=12598>

This study measured the effects of the iPad application entitled *Vocabulary Central Grade 6* on vocabulary and comprehension reading skills of 44 sixth-graders. It also evaluated the perceptions of sixth-grade students using the iPad application. They used the application ten minutes a day over a six week period of time, with expectations that each day they would complete a unit. The application was developed by Pearson

Education in 2010 and is divided into six units of content to help vocabulary development that offers success in comprehension. It provides specific and supportive activities such as flashcards, songs, and trivia games that relate fifteen words at a time to a specific type of reading genre. The results of this study revealed no significant gain in vocabulary knowledge to improve comprehension by using the iPad application *Vocabulary Central Grade 6*. The results do show student interests in using an iPad to study vocabulary, but these results indicate the need for further study concerning the merit of using iPads in the classroom to improve learning.