

**EFFECT OF HANDHELD TABLET COMPUTING
DEVICES ON THE ENGAGEMENT OF MIDDLE
GRADES STUDENTS AS REPORTED BY
TEACHERS**

MASTER THESIS SUMMARY

Ahmed Alghamdi, School of Education, Felician College, Rutherford, New
Jersey, December 2014

1 INTRODUCTION

This summary outlines educators' contributions to this master thesis that addressed the effects on grades three to eight classrooms through research on how grades three to eight teachers view the use of handheld tablet computing devices in classrooms. The study posed three research questions and presented previous research that supports the development of the questions and demonstrates the gap in the knowledge regarding handheld tablet computing devices in the classroom.

Following the review of previous studies, the method used in this thesis to obtain the results is explained. Next, summaries of the results are included to give an overview of the research that was conducted before the concluding section of this summary.

The conclusions sum up the results of the research and presents observations made during the research and their relationship to previous findings.

This study looked at other cases in which the engagement of students in regards to the use of handheld devices was examined to determine the effect, if any, on the outcome of the students' education and participation. This study also aimed to explore the perspective of the educators and what their feelings were about the engagement of students when using handheld tablet devices. This study further analyzed the actions that need to be taken by educators in order to gain the recognition and involvement desired to meet educational applications. These applications demonstrate how a reciprocal style of teaching, promotion of student self-efficacy so they take charge of their own learning experiences, and provision of benefits from self-regulated learning and intentional learning can add to the students' feelings about their ability to perform in an educational setting.

Finally, the research questions for this master thesis are:

1. According to teachers, why do grades three to eight students exhibit changes in engagement when using handheld tablet computing devices?

2. What is the relationship between the amount of handheld tablet computing device use in the classroom and the level of student engagement?

3. How do grades three to eight students' engagement levels change when using handheld tablet computing devices in the classroom based on teacher reflection?

2 REVIEW OF PREVIOUS RESEARCH

Why Grades Three Through Eight Students Exhibit Changes in Engagement with Handheld Tablets

Studies have been conducted that provide information on why students exhibit changes in engagement when using handheld tablet computing devices. McClanahan, Williams, Kennedy, & Tate (2012) reported on a study to determine if the iPad could help a fifth student with reading difficulties focus on his assignments. Their intervention used an iPad for tutoring sessions and revealed that the higher level of sensory stimulation provided by its use allowed the student to engage differently than in normal classroom experiences. Further

study would be needed to see if this higher level of engagement could be generalized in inclusive classrooms instead of in tutoring situations. In a later study, Gebre, Saroyan, and Bracewell (2014) studied student engagement in technology-rich classrooms at the university level to see the relationship between engagement and professors' perception of effective teaching. The classrooms were set up to encourage student-faculty interaction, promote collaborative learning, enrich educational experiences, and provide a supportive environment, including computer use. Students and professors were surveyed and their responses showed that cognitive and social engagement in active learning classrooms were significantly related to the professors' concept of effective teaching if it was seen as a way to develop independence and self-reliance. However, this study may not apply if the technology is limited to hand-held tablet computing devices, and middle-school teachers may not report the same concepts regarded as effective teaching. In a study conducted by Plavik (2012), it was suggested that portable video displays might

be more effective than televisions or computers when using video modeling to teach a preschool-age autistic boy. When he was told to watch the video, his time of attendance was recorded, and he was then required to engage in the model behavior. Even though the portable iPhone made it easy to show him the video prior to receiving a request from his teacher, it is not known if other displays such as tablets might require more intervention. Furthermore, it is not known if a middle school student would respond to training and become engaged in a similar manner. A study by Mouza (2008) focused on comparing middle school classrooms using laptops to nonlaptop peer classrooms. Teacher interview data from the study showed that students who had use of the laptops had higher levels of engagement because the computers provided an opportunity for students to take initiative in the projects they studied. Further study would be needed to see if this reported higher engagement also applies to the use of hand-held tablet computing devices. Finally, Baig (2013) studied the impact that information communication

technology has on students with disabilities. One of the key questions in the inquiry was how iPads impact engagement for students with disabilities as viewed by two high school special education teachers. When interviewed, one of the teachers said all results of engagement were positive because students are always on task when they are using various apps, and she felt students were engaged because they each had their own device. The other teacher felt that the engagement was only temporary and would fade as the technology no longer was new. Because the more positive teacher used the iPads for a greater variety of purposes in the classroom, it is also possible that students are more engaged when the devices are used for a variety of purposes.

Amount of Handheld Tablet Use and Level of Student

Engagement

Studies have shown a positive relationship between the amount of tablet personal computer use and the level of student engagement.

Enriquez (2010) studied circuits classes in community colleges in

California. An interactive classroom environment was used to solicit active student participation during class and was then compared to those that were not. Surveys showed that the interactive format increased student engagement as shown through higher attendance rates and time spent on tasks. As handheld tablets are interactive, they could produce similar higher levels of engagement. Spires et al. (2008) conducted a survey of 4000 middle school students about their perspective on school, technology, and engagement. The data showed students want to be engaged at school and had suggestions as to how technology could be integrated to provide more engagement, such as research and science fair projects. The authors concluded that students reported a clear link between the use of technology and academic engagement. A study conducted by Amerlink, Scales, and Tront (2012) also found that the frequency of the use of handheld tablet computing devices was related to an increase in engagement for college students. Students surveyed who were categorized as high users were found to be more likely to be

engaged in a high level of motivating learning activities. Maninger and Holden (2009) conducted a study that showed how middle school students' engagement levels changed when using handheld tablet computing devices in the classroom. Teacher interviews produced an engaging and accommodation theme that reported students work together more often, help each other more, and were believed to take pride in collaborating due to the use of their tablets. Survey responses were positive regarding improved engagement due to the independent and collaborative work. Haydon et al. (2012) addressed issues of low academic engagement by comparing the effects of using a worksheet or an iPad to complete a math assignment in an alternative urban high school setting. Students were informed each day if it would be a worksheet or an iPad day. All participants completed social validity surveys about their perceptions regarding the two interventions. Both the teacher and the students completing the surveys indicated that the iPads were more effective than the worksheets in engagement during math class. However,

while the researchers concluded that iPad technology could promote practice opportunities, it is possible that a novelty technique introduced in the classroom may have an effect on the results.

How Grades Three To Eight Students Engagement Levels

Change With Handheld Devices

Boeglin –Quintana and Donovan (2013) conducted a study using iPod-shuffles to provide audio books for student silent reading in a kindergarten classroom. Students either listened to story books on the iPods or used silent reading every day during a six-week study period. Surveys revealed that students were more motivated to listen to an entire story on the iPod instead of just shuffling through a book. Although the device used in the study was not an iPad and the students were younger than grade three, the responses indicated that students were motivated to stay engaged with the story books because the technology devices were desirable to use. LaRoche and Flanigan (2013), however, found that increase in the use of technology could lead to less engagement and more retreatist

activities in older students. In a survey administered to over two hundred graduates, the results showed that over half of the students did not use a computer in class. Of those that did, they were used primarily to take notes, and common responses were also using Facebook and sending emails. Teachers, on the other hand, report that the use of handheld computing devices has a positive effect on student engagement in several ways. In a study conducted in a university laboratory classroom and at a suburban middle school, data was collected involving lesson plans, work samples, usage data, interviews, and observations. Most of the teachers responded that engagement was improved with handheld computing devices because it allowed students to write more and enjoy the process of practicing. Students also were engaged because they were allowed to make choices as to which computing device gave them the results they needed (Swan, Hooft, Kratcowski, 2005). Gulchak (2008) conducted a study using a mobile handheld computing device to teach attention self-monitoring to an eight-year-old student with

emotional and behavior disorders. The results showed the student had a 26% increase in mean on-task behavior during intervention with the device. The student expressed excitement and others in the class were also interested in a program that helped them to stay on task. Although the study requires replication, it showed that self-monitoring attention using a handheld computing device allowed a student to stay on task in a classroom setting. In another study, Becker (2000) surveyed over 4000 teachers, principals and technology coordinators at over 1000 schools encompassing grades 4 through 12. The survey included items about the teacher's objectives as far as student motivation, as well as how they observed their students using computers both in and out of the classroom setting. The results showed that teachers felt students engaged with computers to access information, or to use software and the Internet during class time. In a later paper, Manuguerra and Petocz (2011) reported on teacher perception regarding the use of iPads in tertiary classrooms in Australia. Both student and teacher responses were

included in the paper and described the benefits provided to the students, particularly regarding increase in engagement. The increased engagement was apparent during lectures, when students were able to record and annotate their notes and slides in real time, keeping them engaged with the lecture. Marks, Laxton, McPhee, Cremin, Sneider, and Marks (2011) reported on their study conducted in Scotland in a private school with children between eight and eleven years of age using two classrooms, one with iPad use and one without, to determine how the use of touch screen technology impacted student engagement. When the results were analyzed, they showed significant higher levels of engagement in cognitive, emotional, and overall engagement. Teachers reported that student engagement improved when students were quickly able to flip through many apps and use them intuitively, something they could not do with any other means of learning. One study important to this thesis is the work of Song (2007), who analyzed research reports, conference proceedings, and books to classify application of

handheld devices in educational settings. After analyzing recent reviews, Song (2007) subsequently classified handheld computing device applications into six categories. Those categories were educational, managing, information seeking and handling, games and simulations, data collection, and context awareness. However, Song concluded that educational use of handheld devices only provided an add-on experience for students.

Rationale

The literary research showed that studies had been conducted regarding the use of handheld computing devices and student engagement, but little information was available for grades three to eight classrooms. Furthermore, most research reported did not provide enough data regarding how teachers view the effects of the devices on student engagement. Therefore, there was a need for a study that addressed how teachers view the effects of the use of handheld tablet computing devices in grades three to eight classrooms. The effects were analyzed by collecting data on why and

how students engage using the devices, as well as on the relationship of the amount of device usage and the level of engagement.

3 METHODOLOGY

Identification of research problems and review of relevant literature resulted in a research design based on a quantitative/qualitative survey. The first research problem was discovered after reviewing Enriquez's (2010) and Song's (2007) studies. They both reported that transitions have taken place in the classroom due to emerging technology, including the use of handheld computing devices. The problem identified through these studies was that handheld computing devices are being used more in classroom settings but that the impact of the use has not been documented. A second research problem also was identified by reviewing Song's (2007) research, which is that handheld computing device technology presents a new way of thinking which affects how students and teachers function and interact in the classroom. A third problem came out of Enriquez's (2010) research. Enriquez (2010) stated it is

necessary to know how handheld computing devices can enhance student learning.

The study took place at two private catholic schools in northern New Jersey in 2014. In order to produce information that was useful, two schools were specifically selected to provide participants because tablet handheld computing devices were already used in these classrooms. The volunteer participants were to include at least thirty teachers of grades three through eight at these two schools. The survey included questions to determine current use of the tablet devices and how long the participants had been using the devices in the classroom. The questions were also designed to demonstrate how the tablet handheld computing devices are used in the classroom by using options that included note taking, note and homework organization, internet research, uploading and completing assignments online, student monitoring and assessment, and textbook supplementation. Individuals were asked to determine the level of student engagement based on the usefulness of the handheld

devices, the change in level of student achievement since the introduction of handheld devices, improvement observed in the quality of student work, and increases in engagement of students through the use of handheld devices. The individuals participating in the survey who believed that the handheld devices increase student engagement were asked what they believed was the cause.

The survey instrument contained seventeen questions, with most of the questions providing quantitative data that was statistically analyzed and interpreted. The questions that provided qualitative data were analyzed by descriptive paragraphs, with themes emerging from this analysis. Research question one asked how the use of handheld tablet computing devices increased student engagement, which was addressed in the survey through questions that identified the uses of the devices in the classroom and the causes for an increase in engagement when using handheld computing devices.

Research question two was based on the amount of time handheld computing devices were used in the classroom and the level of

student engagement, which was addressed in the survey through questions that identified how many lessons were taught per week using the devices and any increase taking place in student engagement. Research question three asked how student engagement increased through the use of handheld computing devices which was addressed by questions that provided information about the rise in levels of engagement, the quality of student work, and any additional uses of the devices requested by students.

Fifteen of the questions in the survey provided data that was quantitative and was statistically analyzed and interpreted based on percentages by entering data into an Excel program. One question provided qualitative data that was analyzed by descriptive paragraphs and categorization of the responses, through which themes emerged. Finally, one question required two responses. One response was analyzed statistically, and the second response provided qualitative data that was analyzed by descriptive paragraphs and categorization of the responses.

4 RESULTS

There were 23 teacher participants who volunteered to complete the survey. Of those, 61% were in general education classrooms and 39% were in inclusive classrooms. No teachers reported teaching in a special education or education resources-pullout classroom. When asked what content areas were taught using handheld tablet computing devices, language arts were taught by 23% of the teachers who used the devices in the classroom, math and social studies were taught by 18% science by 17%, and the arts by 12%. Furthermore, 12% of those teachers reported teaching other subjects using handheld tablet computing devices, including Spanish, technology, reading, and computers. The fact that language arts had the highest percentage of any subjects taught using handheld computing devices may be related to high usage reported for internet research.

When asked when they first began using handheld tablet computing devices in the classroom, 26% reported they have never used them, 52% reported one year or less, while 22% reported from one to three

years. When asked how they integrate handheld tablet computing devices into their lessons, 88% reported internet research, 59% to assess student progress, 53% for student note taking, 47% to supplement textbooks, 41% to organize notes and homework assignments, and 24% to upload and complete worksheets online. There were also 24% who reported other uses, including taking pictures, student collaboration, reading novels, internet presentations, practicing skills on line, and accessing Bible stories. The teachers were then asked to identify the causes for an increase in engagement when using handheld computing devices if they believed the devices did produce an increase. Based on the responses of ten teachers who answered this question, three themes emerged. Interactive, or hands- on learning was identified by 41% of those teachers. There was also 41% who identified the fact that the use of tablets is similar to how students already interact with others. The ability to perform more research was the reason given by 18% of those responding.

When asked how many lessons per week they have students use handheld tablet computing devices, 48% of the teachers reported one to three lessons, 15% four to six lessons, and 4% reported seven lessons or more. There were also 31% who reported they did not use the devices for lessons. When asked about their level of agreement that students are more engaged with their lessons when using tablets, 39% strongly agreed, 52% agreed, and 9% were neutral. There were none that disagreed or strongly disagreed. As far as seeing a rise in student achievement since the introduction of tablets, 22% strongly agreed, 43% agreed, and 35% were neutral. Again, there were none who disagreed or strongly disagreed. When asked if they agreed that tablets have improved the quality of student work, 17% strongly agreed, 44% agreed, 35% were neutral, while 4% disagreed with the statement. Although 65% of teachers did not report any request for additional use of handheld tablet computing devices, of the 35% who did report requests, the replies were varied and included taking

visual field trips, performing digital dissections, recording lessons, video chatting, and creating presentations.

Finally, when teachers were asked if they agreed that tablet apps are useful in teaching, 39% strongly agreed, 52% agreed, and 9% were neutral. Once again, no teachers disagreed or strongly disagreed.

5 CONCLUSIONS

Classrooms have undergone changes because of advances in technology. One of the changes in the classroom technology is the use of hand held tablet computing devices. Because handheld computing devices are a recent type of technology to be used in the classroom, there is limited research that has been conducted regarding the use of such devices. The data collected from this study provided the basis for several conclusions. Handheld tablet computing devices are recent introductions into grades three to eight classrooms. In this study, most teachers using the devices had only implemented the technology for one year or less, and most of them used the devices for only one to three lessons per week. The teachers

surveyed supported the concept that the use of handheld tablet computing devices increased student engagement, with a total of 91% in agreement. Even though 26% of the respondents have never used the devices in the classroom, only 9% had no opinion regarding engagement, and none of the teachers disagreed that their use increased engagement. This demonstrated that there were strong beliefs regarding the relationship between use of the devices and student engagement. When asked why student engagement increased through the use of handheld tablet computing devices, one theme that emerged was that the devices are interactive, providing hands-on opportunities for the students. This theme is in line with the higher level of engagement observed in community college classrooms through the use of interactive formats (Enriquez 2010). A second theme was that the devices align with what students already use to interact in their everyday world.

Increase in student achievement was also supported by most teachers responding to the survey. Even though these responses were based

on teacher perception, it would be possible to conduct research to see if student achievement test scores support teacher perception. The quality of student work was viewed differently by the teachers than engagement or student achievement, because 4% did not believe that the quality of the work improved. Because quality is a subjective characteristic of student work and is not measurable in the same manner as achievement, more information is needed to understand this response.

Teachers reported that student used tablet computing most often to conduct internet research. Becker (2000) produced similar research, in which teachers felt students engaged by accessing information and using software or the internet during class time. This demonstrates that the use of tablets is similar to the use of standard computers and laptops in the classroom. The second most common use reported was note taking. According to Manuguerra and Petocz (2011), when older students were able to record and annotate their notes and slides in real time, it kept them engaged with the lecture. This study's

results might indicate that younger students use the devices in these manners because there is not enough support for teacher to integrate a wider variety of uses. Furthermore, the uses requested by students include those that are more highly interactive such as virtual field trips, digital dissections, and creating presentations. This supports the teachers' perception that students are more engaged when using handheld tablet computing devices because they are interactive. This study has shown that technology through the use of handheld tablet computing devices in the classroom may have a positive impact on student engagement. With the rapidly increasing developments in technology, it is perceived that the educational world must continue to integrate the use of technology into daily instruction in order to prepare students for an exciting and promising future. Computer technology is the widest used medium to access information in the world today, pointing to the importance of teaching students how to utilize technological devices in the learning process.

6 REFERENCES

- Amelink, C., Scales, G., & Tront, J. (2012). Student use of the tablet PC: Impact on student learning behaviors. *Advances in Engineering Education*.
- Baig, I. F. (2013). Examining the impact information communication technology (ICT) has on adolescents with disabilities. *International Journal of Information and Education Technology*, 3(6), 597.
- Becker, H.J. (2000). Pedagogical Motivations for Student Computer Use That Lead to Student Engagement. *Educational Technology*. September-October.
- Boeglin-Quintana, B., & Donovan, L. (2013). Storytime using iPods: Using technology to reach all learners. *TechTrends*, 57(6), 49-56.
- Enriquez, A. G. (2010). Enhancing student performance using tablet computers. *College Teaching*, 58(3), 77-84.
- Gebre, E., Saroyan, A., & Bracewell, R. (2014). Students' engagement in technology rich classrooms and its relationship to professors' conceptions of effective teaching. *British Journal of Educational Technology*, 45(1), 83-96.
- Gulchak, D. J. (2008). Using a mobile handheld computer to teach a student with an emotional and behavioral disorder to self-monitor attention. *Education & Treatment of Children*, 31(4), 567-581.
- Haydon, T., Hawkins, R., Denune, H., Kimener, L., McCoy, D., & Basham, J. (2012). A comparison of iPads and worksheets on math skills of high school students with emotional disturbance. *Behavioral Disorders*, 37(4), 232-243.
- La Roche, C. R., & Flanigan, M. A. (2013). Student use of technology in class: Engaged or unplugged? *Journal of College Teaching & Learning (Online)*, 10(1), 47.
- Maninger, R. M., & Holden, M.E. (2009). Put the textbooks away: preparation and support for a middle school one-to-one laptop initiative. *American Secondary Education*, 38(1), 5-33.
- 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), 5.
- Marks, D., Laxton, T., McPhee, I., Cremin, L., Sneider, A., & Marks, L. (2011). Does use of touch screen computer technology improve classroom engagement in children? *The Online Educational Research Journal*.
- McClanahan, B., Williams, K., Kennedy, E., & Tate, S. (2012). A breakthrough for Josh: How use of an iPad facilitated reading improvement. *TechTrends*, 56(3), 20-28.

Mouza, C. (2008). Learning with laptops: Implementation and outcomes in an urban, underprivileged school. *Journal of Research on Technology in Education*, 40(4), 447-472.

Plavnick, J. B. (2012). A practical strategy for teaching a child with autism to attend to and imitate a portable video model. *Research and Practice For Persons With Severe Disabilities*, 37(4), 263-270.

Song, Y. (2007). Educational uses of handheld devices: What are the consequences? *TechTrends*, 51(5), 38-45.

Spires, H. A., Lee, J. K., Turner, K. A., & Johnson, J. (2008). Having our say: Middle grade student perspectives on school, technologies, and academic engagement. *Journal of Research on Technology in Education*, 40(4), 497-515.

Swan, K., Mark van 't Hooft, Kratoski, A., & Unger, D. (2005). Uses and effects of mobile computing devices in K-8 classrooms. *Journal of Research on Technology in Education*, 38(1), 99-112.