

The Impact of Technology Use on Student Engagement and Achievement in a Social Studies

Inspired Classroom: A Comparison Study of Laptops and Apple iDevices

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Introduction

As we better prepared our students as the next generation leaders typical classroom instruction has changed along with the tools to engage our students. Classrooms must be laid out and equipped with the tools which will increase student engagement. An inspired classroom brings technology into the middle of the instruction instead of around the outside edges. This allows students working in collaboratively on problem solving a higher order thinking activities using technology at their fingertips. This technology enhanced learning environment has been assumed to increase student motivation and increase pedagogy.

Today's learners are the first generation to be raised in technological simulation society. To increase student engagement we must first ensure the proper tools are incorporated into the classroom. Technology in the past has consisted of desktops in computer lab, computers in classrooms and laptop carts. To integrate an inspired classroom the technology must be sitting on the desktop for all group members to have access. Of the tools previously mention a laptop is the best fit for this learning environment. Mobile devices such as smart phones, portable gaming systems and tablets are part of many students everyday life. In 2007, Apple introduced their iDevices on a larger scale first the iTouch and iPhone then the iPad. These devices along with other smaller devices have been introduced into pedagogical approaches integrating technology. "Despite the rapid adoption of iPads for educational and professional purposes, the extent to which this technology enhances student engagement and learning in the classroom is not well understood (Chen, Lambert, & Guidry, 2010)."

Research studies have been conducted on the use of technology immersion, laptops and netbooks in regards to student engagement. Limited amount of research has taken place in regards to iDevices to due short amount of time in the educational environment and cost

effectiveness. “Currently, there are few research studies documenting the impact of integrating iPads for learning in the social studies. This may be due in part to the relatively recent development of this tool and its adoption by schools (Berson, Berson & McGlinn Mantra, 2011)”. However, research has not been complete comparing these two types of devices and their impact in increase student engagement. Prior to implementing new technology into instruction it is important to research the effect of learning and engagement. “Assessments of student perceptions of learning and engagement have traditionally been used for gauging the success of new instructional technology (Alavi, 1994).”

Purpose

The purpose of this qualitative research study is to test the use of various technology tools used in learning and their impact on student engagement by comparing the use of laptop with an iDevice in a 7th grade in a social studies inspired classroom in one Greater Atlanta middle school.

The following objectives will be addressed:

- Examine student’s viewpoint of what role technology plays in their engagement in the classroom.
- Examine which technology device has greater student engagement in student learning a laptop or Apple iDevice.
- Examine the reasons why one device would have higher student engagement than other.

Research Questions

Central Question:

- What technology device (laptop or Apple iDevice) improves student engagement in a social studies inspired classroom?

Sub questions:

- What are the student's viewpoint regarding technology in the classroom?
- What technology devices are being used in the classroom?
- Why does one technology device have a greater impact on student engagement in learning?
- What factors students believe increases their engagement in learning using various devices?

Importance of Study

As Fulton County School District continues its path for full technology integration into instruction and 1:1 access to technology, it is critical to have the correct tools in place in classrooms. The importance of this study is to provide feedback to school administration and school technology committee in which technology devices have higher student engagement and whose functionality works best in classroom instruction prior to making additional technology purchases. By using research to guide these decisions, this reflects the school's view in valuing the importance of educational research and student buy in to technology and its impact on their achievement.

Definition of Key Terms:

iDevice: any mobile electronic devices marketed by Apple Inc. operating on an iOS operating system.

iGeneration - refers to a smaller proportion of the Generation Y where by the users actively engage with technology in its development, progression, and its use in the workplace, so that the technology can evolve within the means of the generation. (Whittaker)

Inspired Classroom- is a new integration model that takes the teaching and learning enhancements found in 1-to-1 classrooms at the secondary level and puts them to use in "regular" classrooms at the elementary level. Moving away from a traditional classroom arrangement, the Inspired Classroom model brings four or five classroom computers from the perimeter of the room to the student's desks. The student desks are arranged in small groups that allow students to work cooperatively, and each group has dedicated access to a computer throughout the day.

Student Engagement: Schlechty (2002) identifies authentically engaged students as those who "see meaning in what they are doing, and that meaning is connected to ends or results that truly matter to the students. Indeed, these authentically engaged students may be willing to do some boring or otherwise meaningless tasks, precisely because they see linkage between what is being done and some task-related end of significant consequence to them."

Laptop – a portable, usually battery-powered microcomputer small enough to rest on the user's lap.

1:1- One technology device for every one student to use in instruction and learning.

Scope and Limitations

The scope of this research study will encompass 7th grade middle school students in a suburban area of Atlanta, Georgia. The scope of the study could be expanded to include any age students at any school location. In expanding the scope to vary any groups, the study could compare the results based upon the age groups. In expanding the study and based upon the analysis could result in different technology devices having an impact on student engagement.

Since the study has a narrow scope with the participants only includes 14 middle school students at one middle school the study has limitations. While the participants will be diverse the study will be localized to a narrow group of students.

Another potential limitation of the study is the variables which will be measured based upon the students behaviors and not actual behaviors. The study does not address actual student academic achievement but describes the participant's value in the ease or use of the tools.

Literature Review

Student Engagement

“Curiosity can be a powerful motivator of behavior...” (Arnone, Small, Chauncey, & McKenna, 2011). Along with raising student achievement student engagement is one the number one key issues today in education. “Technology can play a role in triggering and addressing personal, situational, and contextual factors that support autonomy and competence and engender active, deep learning”(Arnone et al., 2011, p. 182). Students today have grown in technology persuasive environments, these environment increase students curiosity and interest. Due to this fact, the technology persuasive learning environments are increasing in schools. Along with being a persuasive environment new media technology can lead to greater differentiation which increases motivation, self-regulation, and self-efficacy. Arnone et al. (2011) states cyber learning can allow learners to engage learners by being driven by the learners' interest or demands. The introduction of capable handheld devices such as smartphones, iPads and mobile devices lead to further engagement since learning can take place as needed or when it is required at any time.

The hope would be that higher student engagement would lead to higher student achievement. A study in Taipei in 2007 was conducted in two science classrooms in which one was student centered and the other teacher centered classrooms both with technology integration. Previous studies Chang (2003) had shown students in teacher centered classroom performed better on assessments than student centered classroom (Wu & Huang, 2007). The study did reflect higher student achievement in teacher-centered classroom especially for low achieving. However in regards to use of technology, the use of technology within the student centered classroom did have an impact on student emotional engagement. But computer based learning did not have an impact on student achievement.

Technology

Since students today are the iGeneration, the use of technology will have various influences in student lives. Mears (2012) believes technology will have numerous effects on curriculum and instruction. The effects from child obesity, social marketing, child nutrition, and teaching and learning. The iGeneration students have a greater level of technology expertise than their teachers. Teachers must understand what they see as innovative is not on the same level as their students. Students are used to information at their fingertips, they are multi takers, believe “googling” is the way to go, and welcome new challenges. Mears (2012) states they need constant motivation and feedback to complete task. They will struggle with research based tasks, since they are used to having the information at their fingertips.

As we look for new innovations to engage teaching and learning, the correct learning environment need to be integrated to improve achievement. “These kinds of experiences are important because research shows that students learn more when they are engaged in meaningful, relevant, and intellectually stimulating work “(Shapley, 2011, p. 299). In Shapley’s research the

following research questions were asked: What is the effect of technology immersion on students' learning opportunities? Does technology immersion affects student achievement? Shapley cites several studies which associated increased student engagement, motivation, and lower student conduct violations due to use of 1:1 computing. The results of Shapley's study have shown some increase of student achievement in reading; however, there was no significant improvement in math achievement. The researchers speculated that such insignificant might be contributed to uneven implementation undermined larger increase in student achievement (Shapley, 2011, p. 312). Technology immersion in the classroom has resulted in students voluntarily taking initiative for outside school technology based projects and decrease in conduct violations. However studies in regards to student achievement have not been completed on a large scale. Other studies outside of Shapley's have shown achievement but there was no statistical control. Several studies in regards to the role of technology in student achievement in writing, students in dimensions in writing including content and ideas (Shapley, 2011, p. 302). Shapley's study immersion study took place over three years. Immersion varied among classroom dependent on teacher readiness and certain teachers unable to use technology at all in their classroom. This instability in implementation undermines a true picture the role technology plays in student achievement.

1:1

Studies have suggested that integration of 1:1 computing has impact student academic student engagement in a positive manner. 1:1 computing is the one device for each student. The use of laptops in the classroom have increase student engaged in more diverse writing activities, analysis of reading, and increased privacy in student response. Keengwe, Schnellert, & Mills (2011) conducted a qualitative review on effects of 1:1 laptop initiative has on student academic

performance based upon perceptions of the students and the high school faculty. This study concluded that the use of 1:1 laptop increased student engagement, motivation and ability to work individually. This program also increased use of technology at school and at home. The reason from the faculty believed 1:1 computing improved student learning experiences across the board including at risk and high achieving students (Keegwe, Schnellert, & Mills, 2011). The use of technology also increased other areas of education including attendance, parent satisfaction with their student's education, meet changing needs of students. 85% of students felted the laptops improved quality of work and 62.5% said this use motivated them to do their work. 76.9 percent of the faculty believed the use of the laptops improved student engagement, and 69.2% saw an improvement in student motivation with laptop use (Keengwe et al., 2011).

The theme of student engagement carries over through many and all contents from “inverted” or “flipped” rooms. This can range from teachers preparing lectures in podcasts for students to review ahead of lectures or after. The use of tablets in math and science classes to increased student centered learning supports students with disabilities by recuing stress and sensory issues along with ease with note taking. This improves performance and retention. Students are able to watch realistic videos of teachers solving math problems also with individual annotation of work (Bangs, 2011)

Larkin (2012) compared 1:1 computing to 1:2, and concluded that 1:1 had a higher balance of student engagement, productivity, and individual learning in a net book environment. Using a varied approach between 1:1 and 1:2 in computer use in the classroom and did different implementation strategies receive the same outcomes. The 1:1 classroom used the net books every day in group work and later moved to more individualized approach. The 2:1 classroom had issues due to availability. The teacher felt she had to plan different activities for the students

and was a disruption to classroom instruction. This research did not show an advantage to the 1:1 approach in the terms of engagement but more individualized task oriented activities.

Teacher and students felt that 1 1:1 ½ approach was more collaborative. However, the 1:2 approach had increased student involvement, teacher support and social activity (Larkin, 2012).

iDevices.

“The increased affordability and popularity of mobile iDevices, such as smart phones and iDevices, makes them ideal candidates for investigations into the possible applications of emerging technological devices in pedagogical approaches with higher education” (Cruz-Cunha and Moreira cited in Mayberry et al., 2012, p. 203) Affordability is a key factor in the implementation of technology into instruction, school and educators are looking to the best ways to incorporate technology in their schools. When Apple introduced their iDevices the iTouch became a viable solution. Limited research has taken place of the effectiveness of these tools. Mayberry et al. (2012) looked to further review study of Active Learning using Information Processing (IP) model. This theory compares short term memory with prior knowledge using stimulus decides to move the knowledge in to long term memory. The use of blended learning incorporating Internet technology would be the stimulus. Mayberry et al. (2012) incorporates the IP model with an iTouch being the conductor of the stimulus. Using a qualitative and quantitative methods using student feedback in 8 higher education classrooms, the utilized the iTouch in various ways. Methods of use included YouTube videos, Goggle Docs, Student created videos, email and social media. The outcome reflected the student found the devices to be a helpful supplement to standard teaching methods some students preferred traditional methods (Mayberry et al., 2012). There were some limitations in the research which is lack of uniformity in the methods of use of the iTouch and focusing on a smaller faculty. The research

does provide some validity of the use of these devices with student engagement. This use of the items also is beneficial when there is limited availability of funds.

Implementation

To ensure the use of technology meets the needs of students to improve student engagement, implementation of technology in our school must be meaningful, relevant and strategic. Blow and McConnell (2012) Teachers must be commitment to the integration of technology into instruction. As Shapley (2011) mentions the hindrance implementation on student achievement in technology immersion, this is further mention in studies in regards to acceptance of technology tools in the classroom. (Ifenthaler & Schweinbenz, 2013) understand the components of instruction for 21st century learners; use standard based technology instruction, and use technology to engage students with challenge based learning opportunities, and undertakes action research. Teachers must buy into the implementation of technology and integrate it into classroom practice. “Without a clear understanding of how and why teachers accept or reject technology in classroom practice, the full integration of technology as advocated by constructivism” (Ifenthaler & Schweinbenz, 2013, p. 532)

Methodology

Overview of Research Design

The design of this research project was mixed model using both quantitative and qualitative analysis. Participants took several surveys which is using the Likert scale with a range of 1 - 5. The numbers in the range have varied meanings dependent upon the question. The participants completed tasks during classroom instruction using both laptops and iDevices. The participants took part in semi-structured interviews which provided researchers ability to

gain a new viewpoints or aspects from the participants which could guide implementation of technology devices in classrooms.

Participants

In the broadest compilation of the study, the outcome would address the population of middle school students in the United States. However, the sampling did not represent the vast diverse of the country.

The setting for this study was a 7th grade social studies classroom in Alpharetta, Georgia. This school is located in suburban area of Atlanta, known as Roswell, Georgia. The middle school is a Title 1 school with over 50 percent of the student population on free or reduced lunch and is a high poverty. The ethnic make- up of school is 42% black, 32% Hispanic, 36% white and 3% multi-racial (<http://reportcard2011.gaosa.org>, 2011). This setting of participants does include a diverse sampling compared to other middle schools in the area.

This middle school has 800 students with 250 students presently in the 7th grade. The students in 7th grade range from 12 to 14 years old. The participants in this study included 38 students from two 7th grade social studies class periods. The samplings of these 38 students in this advanced class are very diverse in gender, ethnic background, and socio-economic status.

Data Sources/Instrumentation Procedures

The instrumentation being used in this study was a combination of both qualitative and quantitative data collection methods. Data collection will be student surveys and student questionnaires. First, a survey based on a modified version of the Computer Attitude Questionnaire originally created by Dr. Rhonda Christensen and Dr. Gerald Knezek (Christensen & Knezek, 1997),

The project took place over two weeks. Since the participants are minors, their guardians provided written consent to their students taking part in the project. The participants and their guardians also given the purpose of the study. Participants answered two surveys at the beginning of the project one which included questions regarding demographics and access to technology. The second survey was an attitude survey on using technology in learning. The participants took the same attitude survey at the end of the project. The research administrator delivered these instruments to the participants online and the data collected through an online data collection site.

Data Analysis

The purpose of this research study was to address three main research questions: *1. Which technology device (laptop or Apple iDevice) improves student engagement in a social studies inspired classroom. 2. Why does one technology device have a greater impact on student engagement in learning? And 3. What factors students believe increases their engagement in learning using various devices?* The results could influence hardware device purchases at the school in the future.

The participants of the study first took a *Demographics and Technology Use Survey (Appendix A)* to gauge their access and use of technology. The sexual makeup of the participants are males = 24 and females =14. The majority of the males (9) and females (7) are Hispanic.

Table 1: Demographics

Students	Numbers	African American	Hispanic	Asian	Caucasian	Multi-Racial
All	38	11	16	1	7	3

Male	24	5	9	1	7	2
Female	14	6	7			1

In the reviewing the information in regards to technology, the majority of the students have access to some form of technology. The majority of the students have a smart phone devices (71 %) and most of those devices are iPhones (62%). Outside of smart phones, most of the students have access to either a tablet, computer or laptop at home. Of the students who own a tablet (60 %), the types of devices do vary and iPads (23) do not make up the majority. This does reflect there is a not allegiance or bias towards an Apple brand. Only 55% have access to the internet at home. This could explain why a greater number of students will use their cell phone (47%) to complete school work at home compared to other devices. It looks as those without access to internet still may use their cell service to access the internet at home. The technology use data reflects this are students who have access and are familiar with technology and the majority use technology at home for school work.

Table 2: Technology Use

Smart Phone	Percentages
Own a Smart Phone	71
Own a iPhone	62
Tablets	
Own a Tablet	60
Own a iPad	23

Computers & Laptops	
Own a Computer	71
Own a Laptop	73
Access to Internet	
Have Internet at Home	55
Technology at Home for School	
Those who have access to internet at home use it for school	100
Will use phone for school work	47
Will use laptop for school work	38
Will use tablet for school work	38
Will use a desktop computer for school work	33

Student Academic Achievement

The comparison of the students’ achievement between the two units a two sample t-test was completed using the students post assessments scores from both units. The students completed their lessons on Apartheid using iPads and the lessons on Imperialism using laptops. Higher scores were received after the Apartheid lesson using iPads (mean= 80.39) than scores received after the Imperialism lesson using a laptop (mean= 75.0). A two sample t-test showed that the difference between the mean score was significant ($t=-2.25$, $df=37$, $p<0.05$, one tailed), which indicates the lesson using the iPads may be effective.

Table 3: Post Assessment Scores

t-Test: Two Sample for Means	<i>Laptop/Imperialism</i>	<i>iPad/Apartheid</i>
Mean	75	80.39473684
Variance	145.9459459	107.2183499

Observations	38	38
Pearson Correlation	0.139356559	
Hypothesized Mean Difference	0	
df	37	
t Stat	-2.250794063	
P(T<=t) one-tail	0.015214077	
t Critical one-tail	1.68709362	
P(T<=t) two-tail	0.030428154	
t Critical two-tail	2.026192463	

Student Engagement

During each unit of study the students completed Activity Evaluation Surveys to gauge student engagement using the different devices. The students completed the surveys prior to the beginning of the activities and after completion of the activities using each type of device. These surveys are scaled using a Likert 5 point scale. These surveys are attached as Appendix B and C.

The paired sample t-test for *Laptop Activity Evaluation*, showed student engagement while using laptops increased after usage (mean= 116.50) in comparison to their engagement prior to laptop usage (mean=112.85). There was no significant difference between the before and after evaluations (t = -1.25, df = 25,p = 0.22). We fail to reject the null hypothesis. This indicates the use of laptop usage did not have a statistically significant positive effect and is not significant because the P value is .22 which is greater than .05 which indicates no statistically significant

difference in scores.

Table 4: Laptop Pre and Post Activity

t-Test: Paired Two Sample for Means		
	<i>Prelaptop</i>	<i>Postlaptop</i>
Mean	112.8461538	116.5
Variance	235.8953846	208.58
Observations	26	26
Pearson Correlation	0.506722581	
Hypothesized Mean Difference	0	
df	25	
t Stat	-1.257031711	
P(T<=t) one-tail	0.110179906	
t Critical one-tail	1.708140761	
P(T<=t) two-tail	0.220359813	
t Critical two-tail	2.059538553	

The paired sample t-test for *iDevice Activity Evaluation*, showed student engagement while using iDevices decreased after usage (mean= 114.25) in comparison to their perception prior to iDevice usage (mean=118.45). There was no statistically significant difference between the before and after evaluations ($t = 1.58, df = 23, p = 0.13$). The null hypothesis is not rejected. This indicates the use of iDevice usage did not have a statistically significant effect and is not significant because the P value is .12 which is greater .05 which indicates no real difference in

scores.

Table 5: iDevice Pre and Post Activity

t-Test: Paired Two Sample for Means		
	<i>Pre iDevice</i>	<i>Post iDevice</i>
Mean	118.4583333	114.25
Variance	145.1286232	289.0652174
Observations	24	24
Pearson Correlation	0.645791921	
Hypothesized Mean Difference	0	
df	23	
t Stat	1.582844885	
P(T<=t) one-tail	0.063555939	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.127111879	
t Critical two-tail	2.06865761	

The two sample t-test for *Laptop Activity Evaluation and iDevice Activity Evaluation*, showed student engagement while using laptops was higher (mean= 116.50) than their engagement while using iDevices (mean=114.25). There was no statistically significant difference between after the iDevice and laptop evaluations ($t = 0.50$, $df = 45$, $p = 0.62$). The null hypothesis is not rejected. This indicates the use of laptop usage did not have a positive effect and is not significant because the P value is 0.61 which is greater than .05 which indicates no

statistically significant difference in scores.

Table 6: Laptop and iDevice Post Activity

t-Test: Two-Sample Assuming Unequal Variances		
	<i>lpostscore</i>	<i>ipostscore</i>
Mean	116.5	114.25
Variance	208.58	289.0652174
Observations	26	24
Hypothesized Mean Difference	0	
df	45	
t Stat	0.502278546	
P(T<=t) one-tail	0.308960349	
t Critical one-tail	1.679427393	
P(T<=t) two-tail	0.617920699	
t Critical two-tail	2.014103389	

The students completed two evaluation surveys at the end of each unit regarding their interaction with the different devices. These surveys were open ended questions having to do with the features such as sounds and visuals, were they able to learn better with the devices, what they like most and least, and how does touching and interacting with the devices affect their learning. In both surveys, the students noted the following positive themes of using technology in their instruction: better attention and improved learning. The negative theme which was noted was focused only on the laptop having to do due to their age and condition. The major positives

noted in these surveys the student noted they were more focused using technology in instruction than traditional instruction. A greater number of students noted using laptops were fun, while a greater number said iDevices keep them more focused. Students noted while using the iDevices they could work at their own pace. While using both devices, the majority of the students noted that interacting with the devices improved their learning. Additionally the students noted several other aspects which related to their engagement in learning are: use of videos, engage the world/learn new things and no writing. All of these items are consistent between both devices except for the isolation of the data of the school laptop. These laptops are over five years old, slow to boot up and batteries do not hold a charge.

Table 7:

<u>Topic: Better Attention</u>	<u>Code with Frequency</u>
Laptops	22 Fun
	10 Focused
	6 Not Difference
iPads	20 Focused
	10 Own Pace
	8 Not Difference

Table 8:

<u>Topic: Improved Learning</u>	<u>Code with Frequency</u>
Laptops	25 Interact with the Device
iPads	29 Interact with the Device

Table 9:

<u><i>Topic: Like the most about the device</i></u>	<u><i>Code with Frequency</i></u>
Laptops	4 Videos
	5 No Writing
	5 Engage the world/ Learn new things
iPads	6 No Writing
	4 Videos
	5 Engage the world/ Learn new things

Table 10:

<u><i>Topic: Change one item about the device</i></u>	<u><i>Code with Frequency</i></u>
Laptops	10 Slow/Old
iPads	2 Autocorrect

Conclusion

The results of this study can guide the school’s decisions in regards to future technology purchases based upon the results of student academic achievement and student engagement using laptops and I Devices. In regards to student academic achievement, there was a real significant increase in student scores on the post assessments on the topic of Apartheid in South Africa using iDevices compared to the unit on Imperialism in Africa using laptops. However, it is not statistically significant, there could be a couple of factors in this increase. The unit on Imperialism is a slightly more challenging unit than the unit on Apartheid. The sample size of 38

students is somewhat of small, which makes it harder to detect an effect. If the same study was completed with a larger sample with only a 4 point increase, it might be significant.

In reviewing the results of the student's surveys and evaluation to their engagement in using the two different hardware devices. The pre and post activity surveys did not result any significant change. This was the case in comparing post surveys of laptop and iDevices, the results reflect no significant difference in student engagement in their learning whether using a laptop or iDevice.

The activity evaluations did have the student note the issue with the condition of the laptops but this not affect their motivation and learning in compared to the iDevices which are newer. The students noted both hardware devices improved their learning by keeping them focused, working on the own pace and fun to use.

Based upon the results, this school could make purchasing decisions based upon funding. Student engagement and achievement would not be hinder based upon the technology device. Future studies in this comparisons could include a greater sampling and a greater variety of students. While this study did not reflect an impact on student engagement based upon the devices it does lay the groundwork for future studies.

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Appendices

Appendix A

Student Data and Technology Use Survey

1	Sex	M/F
2	Date of Birth	MM/DD/YYYY
3	Ethnic Group	AA/A/C/M/H
4	Do you own a computer?	Y/N
5	Do own a laptop?	Y/N
6	Do you own a tablet?	Y/N
7	Do own you a smart phone?	Y/N
8	Do you have internet at home?	Y/N
9	Do you technology at home for school?	Y/N
10	Do you think the use of technology during school instruction improves your engagement in class?	Y/N
11	Do you enjoy and feel engaged in social studies classrooms?	Y/N
12	If you use technology at home for school work which device to do you prefer to use?	Open Ended

Appendix B

Laptop Activity Evaluation Surveys

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

Rating Scale:

1 = Strongly Disagree

2 = Disagree

3 = Undecided

4 = Agree

5= Strongly Agree

	Questions
1	I enjoy learning with a laptop.
2	I do like receiving instruction through a laptop.
3	I will be able to get a good job if I learn how to use technology.
4	Using a laptop is very frustrating.
5	I concentrate better in class when a laptop is used to deliver instruction.
6	I would work harder if I used a laptop more often.
7	I do not get a sinking feeling when I think of trying to use a laptop
8	I know that using technology gives me opportunities to learn many new things.
9	I can learn many things when I use a laptop.
10	I enjoy lessons on the laptop.
11	I believe that the more often I use a laptop, the more I will enjoy school.
12	I cannot learn more from books that the laptop
13	I believe that it is important for me to learn how to use a laptop.
14	I feel comfortable using a laptop.
15	I enjoy using the laptop.
16	Laptops are difficult to use.
17	I do think that it takes a longer amount of time to learn when I use a laptop.
18	Using a laptop does not scare me at all.
19	Using a laptop does make me nervous.

20	I do not like receiving instruction through a laptop.
21	Using a laptop is not very frustrating.
22	I will do as little work with technology as possible.
23	Laptops are not difficult to use.
24	I can learn more from books that the laptop
25	I do not think that it takes a longer amount of time to learn when I use a laptop
26	Using a laptop does not make makes me nervous
27	I will not do as little work with technology as possible.
28	I do not get a sinking feeling when I think of trying to use a laptop.

Appendix C

iDevice Activity Evaluation Surveys

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

Rating Scale:

1 = Strongly Disagree

2 = Disagree

3 = Undecided

4 = Agree

5 = Strongly Agree

	Questions
1	I enjoy learning with an iDevice.
2	I do like receiving instruction through an iDevice.
3	I will be able to get a good job if I learn how to use technology.
4	Using an iDevice is very frustrating.
5	I concentrate better in class when an iDevice is used to deliver instruction.
6	I would work harder if I used an iDevice more often.
7	I do not get a sinking feeling when I think of trying to use a iDevice
8	I know that using technology gives me opportunities to learn many new things.
9	I can learn many things when I use an iDevice.
10	I enjoy lessons on the iDevice.
11	I believe that the more often I use an iDevice, the more I will enjoy school.
12	I cannot learn more from books that the iDevice
13	I believe that it is important for me to learn how to use an iDevice.
14	I feel comfortable using an iDevice.
15	I enjoy using the iDevice.
16	IDevices are difficult to use.
17	I do think that it takes a longer amount of time to learn when I use an iDevice.
18	Using an iDevice does not scare me at all.
19	Using an iDevice does make me nervous.

20	I do not like receiving instruction through an iDevice.
21	Using an iDevice is not very frustrating.
22	I will do as little work with technology as possible.
23	IDevices are not difficult to use.
24	I can learn more from books that the iDevice
25	I do not think that it takes a longer amount of time to learn when I use a iDevice
26	Using a iDevice does not make makes me nervous
27	I will not do as little work with technology as possible.
28	I do not get a sinking feeling when I think of trying to use an iDevice.

Appendix D

Laptop Activity Evaluation Questionnaire

Questionnaire Items

Q1. Describe what you like most when a laptop is used in the classroom.

Q2. Describe what you like least when a laptop is used in the classroom. If you could change one thing about the way the laptop is used in the classroom, what would it be and why?

Q3. Do you believe you are able to learn better when a laptop is used in the classroom?

Q4. Does the use of a laptop in the classroom help you to be able to pay better attention? Why or why not?

Q5. Did the visuals used in the lesson help you to better learn the information? Why or why not?

Q6. Did the use of sound help you to better learn the information? Why or why not?

Q7. Does having the opportunity to touch and interact with device affect your learning? Why or why not?

Appendix E

iDevice Activity Evaluation Questionnaire

Questionnaire Items

Q1. Describe what you like most when an iDevice is used in the classroom.

Q2. Describe what you like least when an iDevice is used in the classroom. If you could change one thing about the way the iDevice is used in the classroom, what would it be and why?

Q3. Do you believe you are able to learn better when an iDevice is used in the classroom?

Q4. Does the use of an iDevice in the classroom help you to be able to pay better attention? Why or why not?

Q5. Did the visuals used in the lesson help you to better learn the information? Why or why not?

Q6. Did the use of sound help you to better learn the information? Why or why not?

Q7. Does having the opportunity to touch and interact with device affect your learning? Why or why not?

APPENDIX G

Interview Questions

1. Why (Why not) do you think technology plays a role in your engagement in classroom instruction? Explain
2. Do you see technology as a motivator to learning? If so how and why?
3. Why (Why not) do you think one device could have a higher impact in student engagement in learning?
4. How else could technology improve student engagement in learning? Explain
5. What part of technology use in learning has the biggest impact in your learning?
6. What are other motivators in your learning besides (or if not) technology?

Table 11: Student Scores Laptop Pre and Post Surveys

lprescore	lpostscore	difference
128	133	5
110	131	21
94	87	-7
118	111	-7
124	127	3
105	110	5
114	100	-14
104	106	2
72	95	23
81	118	37
102	113	11
110	110	0
105	124	19
127	129	2
122	120	-2
132	136	4
118	116	-2
123	124	1
113	106	-7
127	131	4
104	135	31
140	135	-5
100	113	13
118	122	4
120	84	-36
123	113	-10

Table 12: Student Scores iDevice Pre and Post Surveys

iprescore	ipostscore	difference
136	132	-4
140	140	0
92	79	-13
117	98	-19
120	118	-2
105	112	7
126	124	-2
101	132	31
112	103	-9
109	102	-7
123	99	-24
109	119	10
130	131	1
125	133	8
125	109	-16
136	128	-8
121	120	-1
130	128	-2
107	106	-1
108	111	3
117	115	-2
120	110	-10
126	123	-3
108	70	-38

Table 10: Laptop and iDevice Post Activity Evaluation Surveys

lpostscore	ipostscore
133	132
131	140
87	79
111	98
127	118
110	112
100	124
106	132
95	103
118	102
113	99
110	119
124	131
129	133
120	109
136	128
116	120
124	128
106	106
131	111
135	115
135	110
113	123
122	70
84	