

December 2016

The Effects of a One-to-One iPad Initiative: A Case Study

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THE EFFECTS OF A ONE-TO-ONE IPAD INITIATIVE: A CASE STUDY

by

Michael Flanagan

A Dissertation Submitted in
Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy
in Urban Education

at

The University of Wisconsin-Milwaukee

December 2016

ABSTRACT

THE EFFECTS OF A ONE-TO-ONE IPAD INITIATIVE: A CASE STUDY

by

Michael Flanagan

The University of Wisconsin-Milwaukee, 2016
Under the Supervision of Professor Carol L. Colbeck

This qualitative case study explored the ways that teachers in a single private middle school integrated one-to-one tablet use in to their classroom practice. The case study also explored how and in what ways the students and teachers perceived that school-provided one-to-one student access to tablets affected student learning. The review of relevant literature included the use of technology in instruction, external factors affecting teachers, and the perception of the effect of technology on student learning.

Over the last thirty years, there has been an increase of computer and tablet use in the classroom (Harold, 2016; Reidel, 2014; Smerdon, Cronen, Lanahan, Anderson, Iannott, & Angeles, 2000; U.S. Department of Education, 2010). As schools implement new computer technologies, they are often soon faced with yet another technology reform effort, as technology changes quickly (Barack, 2010). Students also now use technology and are often more knowledgeable about tablet devices than teachers and administrators. However, students often show teachers how to use the tablet devices, which highlights how

what could be perceived as a challenge is also a benefit (Bradley, Goodman-Deane, Waller, Tenneti, Langdon, & Clarkson, 2013; O'Brien, Rogers, & Fisk, 2012).

Over the last fifteen years, enrollments have increased in private and independent schools (U.S. Department of Education, 2010). Independent and private schools face both opportunities and challenges because they are not supported within a public school district. Administrators and teachers in private and independent schools may have more freedom than those working in public school districts; however, they also have fewer resources available (Davies & Davies, 2014). Private and independent schools must determine the best ways to use resources, which suggest that administrators should be well-informed when investing their limited resources in equipment and programs.

To improve understanding of how private and independent schools might implement a new computer technology initiative, this research involved a single case study of one school nearly three years after the school had provided iPad tablets to all teachers and students in its middle school class sections. According to Patton (2015), a case study is an appropriate mode of inquiry in which a “researcher examines in depth a program...or one or more individuals...using a variety of data.” The case study addressed the following research questions:

1. Under what conditions and in what ways do teachers in a private school integrate one-to-one tablet use into their classroom practice?

2. How and in what ways do students and teachers perceive that school-provided access to students' own tablets affects student learning?

This study is guided by the worldview of critical realism (Bhaskar, 1998; Maxwell, 2012). A critical realist point of view is one which allows for two concurrent views of reality. In the critical realist worldview, there is an understanding that reality exists independent of individuals' perceptions. At the same time, individuals' perceptions of reality are also valid and their perceptions affect their understandings and behaviors (Maxwell, 2012). By adopting the worldview of critical realism, I was able to recognize that the perceptions of the stakeholders in a school implementing a new technology initiative were real and affected their engagement in the implementation, while at the same I recognized that there was an observable reality of the tablet program implementation that existed independently of each individual's perceived reality.

Data collection involved triangulation of three qualitative methods approaches: administrator and teacher interviews, external observations, and student surveys. As this case study was guided by critical realism, the administrators', teachers' and students' perceptions were considered real, as were the observations of the researcher.

Odyssey School, the private school which was site for the case study, had two class sections each of grades six, seven, and eight. All students in

these six classes had been individually assigned an iPad as part of instruction for the previous two years and the current school year at the time of data collection. Nine teachers and two administrators were interviewed, each section of classes was observed twice, and all students in grades six through eight were asked to complete a short survey during their technology classes.

The teachers and administrators at Odyssey School had wide range of previous teaching and technology experiences and varied in age. Prior to implementation of the one-to-one iPad tablet initiative, teachers were allowed to use the tablets themselves in order to learn the devices and plan for using them for instruction. Regardless of previous experience, teachers found that the tablet devices were easy to learn.

Odyssey teachers' and administrators' perceptions of whether the iPad initiative affected teaching strategies were mixed. Five of the nine teachers reported that integrating the iPads had influenced their teaching strategies, whereas four did not. The two administrators reported that integrating the iPads into classroom work had a positive effect on teaching strategies.

The iPad tablets were used by Odyssey School teachers and students in varied ways. Students used the devices in all of the classrooms, although the level and type of use depended on the teacher. Students generally used the iPads to complete course content, access information quickly, and have content delivered electronically. Teachers' perceptions of benefits including processing

content efficiently, and preparing students for use of future modern technologies. Concerns included teachers' perceptions of the iPad as a cause of student distraction, particularly if the tablets were used for other than school-related activities.

Odyssey teachers' prior teaching experience was weakly associated with the depth of their use of iPads in instruction; however, there was no association between their prior technology experience and their uses of iPads for instruction.

Students, teachers, and administrators had differing perceptions of whether and how the one-to-one iPad tablet initiative affected students' learning. Whereas students as a whole reported neither a positive or negative effect of iPad availability on their learning, sixth grade students reported that the iPads had a more positive effect on their learning than did eighth graders. Most of the Odyssey School teachers did not perceive a positive effect of iPad availability on student learning, although the administrators did. Additionally, reported and observed uses of iPads for instruction were analyzed through the SAMR model, and the results indicated that very few of the iPad uses could be considered transformative (Puentedura, 2006).

Key lessons learned from this single case study this study include: a) decision making about technology initiatives should be informed, b) teachers and administrators are also learners, c) students may be using technology devices for learning more than teachers realize, and new programs should be evaluated to

inform and improve practice. Implications for practice include a) allotting sufficient time for teachers to learn new technology, b) determining desired teaching strategies and goals for the initiative prior to implementation, c) teachers should explore new resources and uses for the technology on an ongoing basis, and d) professional development may help teachers distinguish between students who are distracted by the technology and those who are using the devices appropriately for learning. Implications for future research include a) exploring what might be learned from additional studies of technology implementation at private and independent schools, b) investigating how different types of professional development might affect effectiveness of implementing new technology initiatives, c) conducting larger scale studies to validate the SAMR model, and d) conducting larger quantitative studies to assess the impact of technology initiatives on student learning as measured by standardized tests.

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To Ginger, Caitlin,
Brayden, and Ethan

TABLE OF CONTENTS

Chapter One: Introduction.....	1
Introduction.....	2
Problem Statement and Purpose of this Study.....	4
Research Questions.....	6
Rationale and Significance of this Study.....	7
Definitions.....	8
Apps.....	8
Content delivery.....	8
Creativity.....	9
Educational Technology.....	9
Flexible teaching.....	9
One-to-one tablet initiative.....	9
Personalized content.....	9
Production.....	10
Teaching strategies.....	10
Summary.....	10
 Chapter Two: Literature Review.....	 12
Introduction.....	12
Conceptual Framework.....	12
Guiding worldview and theory.....	13
Framework design.....	14
Use of Technology for Instruction and Related Context.....	15
Technology reform efforts.....	15
Early computer adoption.....	17
Laptops.....	18
One-to-one laptops.....	20
One-to-one tablets.....	23
Computer and tablet program evaluation in private and independent schools.....	29
School control.....	30
Factors Affecting Teachers.....	31
Availability of computers and tablets.....	31
Influence by age and generation.....	33
SAMR.....	35
Perception of the Effect of Technology on Student Learning.....	41
Program Evaluation.....	42
Summary.....	44
 Chapter Three: Methodology.....	 45
Introduction.....	45

Rationale for Research Approach.....	45
Case study.....	48
Site selection criteria.....	50
Research setting.....	50
Research Sample and Data Sources.....	51
Data Collection.....	51
Interviews.....	52
Observations.....	54
Student surveys.....	57
Informed consent.....	58
Data Analysis.....	59
Interviews.....	60
Observations.....	61
Student surveys.....	62
Cross-data analysis of activities and perceived learning.....	63
Triangulation of data.....	63
SAMR model.....	64
Issues of Trustworthiness.....	67
Subjectivity and reflexivity.....	67
Power.....	68
Limitations.....	70
Summary.....	73
Chapter Four: Findings.....	74
Introduction.....	74
The Odyssey School Site.....	75
Background, Introductions, and Previous Experience.....	77
The administrators.....	78
The teachers.....	80
SuAnne Kane.....	80
Julie Bennett.....	81
Kim Klein.....	82
Jeri Vonesh.....	83
Robert Burns.....	84
Jennifer Bennington.....	85
Sam Kafer.....	86
Sylvia Acosta.....	87
Jim Burman.....	88
The students.....	89
Implementation of the One-to-One Tablet Initiative.....	90
Teachers with previous tablet or technology experience.....	91
Teachers with limited tablet or technology experience.....	92
Leader support.....	94

Conditions of implementation summary.....	96
Using the Devices – Uses, Benefits, and Concerns.....	96
Effect on teaching strategies.....	97
Perceptions of positive effect.....	97
Perceptions of little or no effect.....	100
Administrative perception.....	100
Conflicting responses in data collection points.....	101
Effect on teaching strategies summary.....	102
Perceptions of student uses.....	102
Benefits and concerns.....	104
Processing course content efficiently.....	105
Preparation for the future.....	108
Cause of distraction.....	109
Use of the tablets for other than school-related activities.....	111
Additional concerns	111
Benefits and concerns summary.....	113
Conditions Under Which Teachers Implement a New Technology Initiative.....	113
Professional development.....	113
Prior technology experience.....	114
Years of teaching experience.....	116
Conditions summary.....	119
Perceived Effect on Student Learning.....	119
Students.....	120
Teachers and administrators.....	122
SAMR.....	125
Conclusion.....	131
Summary.....	132
Chapter Five: Discussion.....	134
Introduction.....	134
Summary.....	134
Key Lessons Learned.....	141
Decision-making should be informed.....	141
Teachers are learners, too.....	145
Using tablets for learning.....	147
Program evaluation informs practice.....	151
Implications for Practice.....	152
Time allotment.....	152
Focus.....	153
Define teaching strategies.....	153
Online instructional tools and related resources.....	154
Distraction.....	154
Perceived effect on student learning.....	155

Implications for Future Research.....	156
Perceived effect on student learning.....	156
Effect on teaching strategies.....	157
Professional development.....	157
Distraction or positive multitasking.....	157
SAMR.....	158
Student learning.....	159
Conclusion.....	159
References.....	161
Appendices.....	172
Appendix A: Email Memo Request Research.....	172
Appendix B: Teacher Interview Protocol.....	173
Appendix C: Administrator Interview Protocol.....	175
Appendix D: Observation Protocol.....	178
Appendix E: Student Online Survey Questions.....	180
Appendix F: Informed Consent (adult administrator).....	181
Appendix G: Informed Consent (adult teacher).....	183
Appendix H: Informed Consent (parent / guardian e-sign).....	185
Appendix I: Informed Consent (parent / guardian physical sign).....	189
Appendix J: Child Assent.....	193
Appendix K: IRB Approval Letter.....	195
Appendix L: IRB Amendment Letter.....	196
Appendix M: Parent Introduction Letter.....	197
Appendix N: List of Codes.....	198
Appendix O: Student Survey Results.....	200
Curriculum Vitae.....	218

LIST OF FIGURES

Figure 1: Conceptual Framework.....	12
Figure 2: SAMR Model.....	35
Figure 3: Data Analysis Matrix.....	60
Figure 4: SAMR Data Matrix.....	65

LIST OF TABLES

Table 1: Personnel.....	78
Table 2: Student Perceptions of Effect on Learning.....	121
Table 3: Student Perceptions of Effect on Learning by Grade Level.....	122
Table 4: Observed Student Uses Categorized by SAMR.....	128
Table 5: Teacher-Reported Student Uses Categorized by SAMR.....	129
Table 6: Student-Reported Uses Categorized by SAMR.....	129
Table 7: Total Reported Uses Categorized by SAMR.....	129

ACKNOWLEDGEMENTS

When I entered the Master's degree program of Administrative Leadership in the Fall of 2010 aspiring to become a school principal, little did I suspect that just over five years later I would be finishing a doctoral degree while being certified as a school superintendent. It has been a very rewarding process, and there are many people who have made it possible.

I would first like to acknowledge and thank my Major Professor, Dr. Carol L. Colbeck. I regard Dr. Colbeck as a mentor, coach, and friend. When I first had the opportunity to learn alongside Dr. Colbeck in a qualitative methods course, I was astounded by her thoroughness and true desire to be of service to her students. That realization had only begun; she has provided me with endless support, guidance, feedback, and motivation throughout the time that we have worked together. This dissertation exercise is truly a collaborative effort between the two of us, and she has pushed me to think in new ways and means. I continue to be astounded by her dedication to me and all of her students, and I recognized that it is beyond luck that I was able to work with her – it was an honor.

When my preliminary examination was conducted, I told the faculty in the room that I could not think of a better set of individuals that I learned from in my tenure; they represent everything that I am as an educator and as a leader. To Dr. Raji Swaminathan – your guidance during our coursework together stretched

me as a scholar, and I still sincerely appreciate the coffee and tea you provided us! To Dr. Barbara Bales – your vast knowledge and experience in curriculum and instruction is overwhelmingly admirable, and I continuously use your resources to learn and grow beyond your courses. To Dr. Thomas Joynt – I have perhaps studied in a greater amount of classes with you as Professor than any other individual. You have sincerely formed me as a school superintendent, and I will always take parts of your own style through the (hopefully) remaining decades of my career.

I have had the fortune of holding a number of job positions and life experiences that have formed me throughout my profession. All I have ever wanted to be in life was a ‘good teacher.’ After spending several wonderful joy-filled years teaching high school vocal music and musical theatre, I was encouraged to accept a Principal position. And only three years after that transition, I found myself in another transition in to central office. In my current role as an Assistant Superintendent, I work with a tremendous central office staff and numerous principals and teachers every day. I am continually overwhelmed at the sense of joy that I hold in this position, and I hope the work that was done on this dissertation affects the way that I think and respond in my professional role.

Of course, there are the personal admirations. My parents always taught me to never accept anything but the best from myself – I am positive that the

completion of the PhD is likely their fault, although in a good way. As experienced educators, I had a great set of role models growing up that gave me a foundation in education that I hope to take with me in the many years to come.

Until the very point of writing this, my family has never known me without some form of graduate studies. When I met my wife, Ginger, I was studying to earn a Master's in Music Education. When our daughter, Caitlin, was born, I was studying to earn a Master's in Administrative Leadership. And throughout the life of our young sons, Brayden and Ethan, the two have never known their dad without "going to Milwaukee for class." It suffices to say that my family has walked beside me in the sacrifices necessary to earn such degrees, and ultimately, I owe my learnings and this dissertation to them. Without my family, this would not have been possible. Thank you, thank you, thank you.

There are so many others I have encountered, both students and faculty, who have positively impacted me greatly. There are simply too many to list by name, but I sincerely thank each and every one of them. With all of you, this was possible.

Chapter One: Introduction

“Okay, you guys need to focus!” said the middle school teacher at Odyssey School when I was observing her classroom to see how teachers and students used their school-issued computer tablets. Two students rolled their eyes, put their iPads down, and turned back toward the teacher as she lectured. Seconds later, they turned to each other with slightly-confused, yet excited, looks, and picked up the iPads. Not ten seconds passed before the teacher exclaimed, “You two, put that down until I tell you that it is time to use it!”

The boys begrudgingly put down the iPads and stared forward across rows of desks and past the teacher. The bell finally rang to signal that it was time to go to the next class.

As the two students were packing up, I approached and asked what they were doing with the tablets when their teacher told them to focus on her lecture. The boys told me they had not understood what the teacher meant when she referred an event that was in the morning news, so they went to the internet to find out more information. “Why do you think that your teacher believes you were not paying attention?” I asked. One of the students exclaimed, “Because she just doesn’t *get* it. She says things I don’t know what she is talking about. We look them up all of the time in other classes, but she thinks that we shouldn’t get to the information on our own.”

I walked with the boys to their next classroom where chairs were arranged in pods at tables. All the students picket up their own iPads, went to different websites, and began talking about what they were finding. The teacher said nothing, but scanned the room. I thought to myself, “what a contrast...I wonder if students are using this technology completely differently, based on the teacher?” The teacher said very little during the entire period, letting the students work at their own pace. When the bell rang, and the students again began to pack up, I went back to the two boys and asked, “what were you doing the entire class, never really looking up from your iPad?” The second boy said, “you know, when the teacher lets us actually learn what we need to but gives us the ability to do it a lot of ways, well, I really enjoy that. It’s a lot better than being told what to do all the time.”

(Observation notes, November 2015)

Introduction

In today’s educational landscape, there is no shortage of available computing technologies to enhance student learning and achievement. There has been an undisputable increase in laptops and tablets used in education (Harold, 2016; Reidel, 2014; Smerdon, Cronen, Lanahan, Anderson, Iannott, & Angeles, 2000; U.S. Department of Education, 2010). Researchers over the past decade have been interested in instructional technology used with whole groups of students (Bauer & Kenton, 2005) as well as technological initiatives, such as a

one-to-one approach. In this approach, a school provides all students in a grade level or class with their own take-home laptop or tablet computer. (Barack, 2010; Diemer, Fernandez, & Streepey, 2013; Eid & Al-Zuhair, 2015; Murray & Olcese, 2011; Rossing, Miller, Cecil, & Stamper, 2012; Shah, 2011; Walters & Baum, 2011). The one-to-one approach to integrating computer technology into K-12 teaching has been of particular interest in recent years as schools invest large quantities of money to provide every student with a computer to use throughout the day as a required aid to their learning. Furthermore, teachers use portable computing devices to help shift the focus from teacher-led instruction to student-centered learning environments (Dunleavy, Dexter, & Heinecke, 2007).

However, due to the speed of technology development in the last several years, it is often the case that the capability of available devices exceeds the ability of teachers, administrators, and students to adopt and adopt technologies for widespread educational reform. From the rise of laptops in the classroom to smart phones, tablets, and even watches, technology often changes yet again before uses can be effectively implemented for classroom instruction.

Indeed, computer technology has been changing the face of education for some time. Computers have been used in the classroom by teachers and students for nearly three decades, as educators have been utilizing software to attempt to enhance learning outcomes (Fried, 2008). By the mid-nineties, teachers used sources from the internet to supplement lessons and curriculum

(Dunleavy et al., 2007). More recently, students have begun to be exposed to more computers, perhaps in the form of multiple units or even a one-to-one initiative. Currently, administrators at many schools are adopting interactive touchscreen tablet devices, most notably in the one-to-one format in which every student in every classroom receives a device to be used for work completion or to enhance their learning (Barack, 2010; Diemer, Fernandez, & Streepey, 2013; Eid & Al-Zuhair, 2015; Murray & Olcese, 2011; Rossing, Miller, Cecil, & Stamper, 2012; Shah, 2011; Walters & Baum, 2011).

Problem Statement and Purpose of this Study

One of the fundamental issues when researching instructional technology is that it often changes quickly (Barack, 2010). Administrators are continually faced with technology reform efforts (Hopkins, 2013; Hess, 2015; Manuel, 2013; Watkins, 2015). Technology reform efforts in the last ten years, such as laptop integration, interactive whiteboard integration, and tablet adoption, have focused generally on student learning and teacher preparation (Hess, 2015). According to administrators, the end goal of school technology reform efforts is to increase learning and achievement in all learners (Hess, 2015).

Additionally, today's students use technology such as laptop computers, tablets, and smartphones at a much higher rate than preceding generations (Bolton, Parasuraman, Hoefnagels, Migchels, Kabadayi, Gruber, Loureiro, &

Solnet, 2013; Bradley, Goodman-Deane, Waller, Tenneti, & Clarkson, 2013; O'Brien, Rogers, & Fisk, 2012, Zickuhr & Madden, 2012). Often, it is the case that youth are more knowledgeable about the uses of technology than teachers and administrators, making it difficult for educators to keep up with the students in knowing the possible uses of the technologies. Today's students have grown up with the computers, tablets and even phones since their early, formative years. In contrast, many educators have not been exposed to the same technology since early in their lives. As educators learn the technology for classroom use, they are faced with both learning the technology and implementing the technology to enhance the curriculum (Bradley et al., 2013; O'Brien, Rogers, & Fisk, 2012).

Tablets have many possible uses in the classroom, both by and for teachers and students. When administrators in a school choose to purchase tablets as the technology to be used by all teachers and students, teachers make decisions about how the devices should be used inside the classroom and for homework. The teachers' individual choices may influence the ways that the use of tablets is integrated in to the learning environment.

Unique to this study is the setting of a private school. Private schools do not have as many resources as public schools (Davies & Davies, 2014), and therefore need to be aware of the return on investment of the resources and purchases. Public schools have been increasing the amount of tablets in schools

in recent years (U.S. Department of Education, 2016). The investment of tablets is a challenge for the large number of independent schools across the country and Wisconsin, as the resources are not as readily available or are under more scrutiny (Davies & Davies, 2014). This case study will provide understanding of the implementation of a one-to-one iPad initiative in the private or independent school setting.

Research Questions

The purpose of this study is two-fold. First, the study will explore what teachers consider and experience when they try to respond to administrators' requests to incorporate the use of tablets for all students in their classrooms. Second, the study will describe how teachers and students perceive the effects of availability of tablets on students' classroom learning.

Specifically this study will address the following questions:

1. Under what conditions and in what ways do teachers in a private school integrate one-to-one tablet use into their classroom practice?
2. How and in what ways do students and teachers perceive that school-provided access to students' own tablets affects student learning?

Rationale and Significance of this Study

Administrators and teachers are continually faced with change in education, influenced both by government and stakeholder pressure. This study will explore the implementation of a one-to-one iPad initiative in a private school. Although the results of the study might also be relevant to stakeholders in the public school environment, private and independent school administrators who are often not faced with the same resources or restrictions as their public school colleagues will be able to derive information to help them in their own situations. The findings and discussion will offer implications for practice and suggestions for future research that could positively impact the field of education.

In particular, this study is significant to educators in that it describes how teachers integrate one-to-one tablet use into their own practices. The study is designed to inform administrators and teachers who are either in process of adopting one-to-one tablets or are currently in the decision-making process of whether or not to adopt one-to-one tablets. Educators and other stakeholders may also use the findings and discussion of this study to determine if the one-to-one adoption might have an impact on the student's perceptions of their own learning.

Aiding in the analysis of this study will be the SAMR model, which is a hierarchical set of descriptors developed to assist teachers in evaluating how they are incorporating technology into practice (Puentedura, n.d.). I use this

model to categorize the technology-related instructional activities into four categories that indicate how the various uses of the tablet technology for instruction might affect students' learning.

I adopt a critical realist point of view for this study. Critical realism posits that two points of view about reality both have validity. Reality exists independent of individual perceptions, while at the same time individuals construct their own understanding of the reality (Bhaskar, 1998; Maxwell, 2012). The critical realist viewpoint is appropriate for this study because it explores how individuals make meaning of their own teaching and learning experiences while also exploring ways that observable teaching and learning interactions may differ from the perceptions of individuals engaged in the interactions.

Definitions

For the sake of this research, the following terms are defined for this particular study:

Apps. Software program in order to fulfill a particular purpose, downloaded to the tablet device.

Content delivery. The vehicle through which educational content is delivered. Content delivery vehicles can include (but are not limited to) the following: teacher-directed content such as lecture, textbooks, videos, digital devices, electronic books, or a combination.

Creativity. A process in which students produce something original in order to accomplish a learning objective.

Educational technology involves using computers and related computerized devices (such as tablets) in the classroom by teachers and students with the primary goal to enhance the teaching and learning process.

Flexible teaching. Occurs when the teacher engages in multiple tasks in the classroom, often interacting with more than one student to foster the learning of each. Flexible teaching contrasts with using a single task, such as lecture, to deliver content to a large group of students at one time.

One-to-one tablet initiative. A one-to-one initiative involves the following: Each student is assigned a tablet for use at the school in order to complete class work. Often, students are allowed to use the devices at home, for school purposes. Professional development has been afforded to all teachers so that, in the absence of paper products, teachers are helping students use effective learning strategies with tablets.

Personalized content. Instructional materials that are personalized to each learner. Personalization can be automated at random by computer software (such as randomized quiz questions drawing from a source bank not influenced by the teacher or the student), or pre-defined by the teacher and/or

the student (such that the source bank of material has been influenced by the teacher or the student).

Production. The ability to complete school-related work on a tablet device.

Teaching strategies. Methods and principles of instruction used to engage students and facilitate their learning.

Summary

In this first chapter of a five chapter dissertation, I provided the reasons and research questions for a case study of the implementation of a one-to-one tablet initiative at a single private school. The case study was conducted with the goal of providing private school administrators, teachers, and technology coordinators and other researchers rich details about the process of implementing similar technology initiatives. This study also explored the effects of such an implementation on student learning from the perspectives of administrators, teachers, and students at one private school.

Subsequent chapters provide additional information about the case study. Chapter Two reviews related literature including literature in the areas of student learning, instructional technology, technology reform efforts, program evaluation, and the worldview of critical realism that guides this study. Chapter Three

describes the methods that I used to collect and analyze data for this research. Chapter Four presents the findings of my research, and Chapter Five discusses the meanings of findings and offers implications for practice and suggestions for future research.

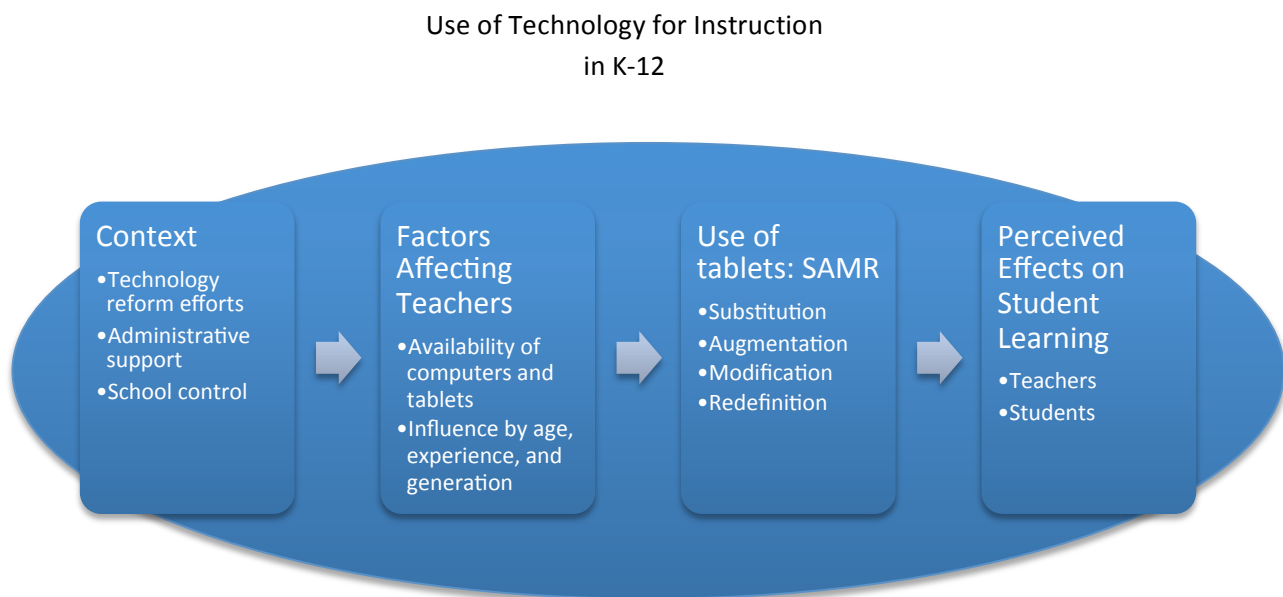
Chapter Two: Literature Review

Introduction

In this review, I will explain the conceptual framework for my study while examining existing literature in the areas of the use of computers and tablets in school, computer and tablet program evaluation in private and independent schools, factors that affect teachers, the SAMR model, and perceptions of the effect of technology on student learning. I will begin by describing the guided worldview and conceptual framework of my study, which will serve as the organizational tool for this chapter.

Conceptual Framework

FIGURE 1 – Conceptual Framework



Guiding worldview and theory. This study is guided by the worldview of social critical realism. Critical realism combines ontological realism and epistemological constructivism. Ontological realism is grounded in the “belief that there is a real world that exists independently of our perceptions and beliefs” (Maxwell, 2012, p. 43). Believing or perceiving that something exists and is or is not real does not preclude that something from existing independent of individuals’ perceptions. Constructivism assumes that “our understanding of this world is inevitably our construction” (Maxwell, 2012, p. 43). The combination of realism and constructivism in the approach of critical realism indicates that reality is socially constructed by the individual; therefore, there is no one reality, while at the same time critical realism suggests that the reality constructed is independent from an observable existing reality (Bhaskar, 1998). Neither view of reality has sole claim as truth. The perceptions or beliefs of an individual are constructed based on prior experiences and assumptions and are not indicative of one reality. At the same time, a reality exists that is independent of the perceptions or beliefs.

Critical realism is appropriate for a case study in that all stakeholders have their own experiences and perceptions of the issue being looked at in the case study, and all of these experiences and perceptions are real to each stakeholder (Maxwell, 2012; Patton, 2015;). It is up to the researcher to explore each individual’s perceptions of reality, observe the context, and ascertain what may be going on by looking at the individuals as well as the program as a whole. The

researcher should understand that stakeholders, including the researcher, have other experiences of their own that affect their realities and understandings of the program being looked at in the case study. Every conclusion is a “simplified attempt to grasp something about a complex reality” (Maxwell, 2012, p. 43).

Framework design. The conceptual framework for this study, depicted in Figure 1, shows factors that influence the use of technology for instruction, particularly in the K-12 setting. Guiding this framework in a linear fashion are the areas of context under which the technology is implemented, factors that may affect the teachers, the SAMR model, and the perception of the effect on student learning.

The first factor in the conceptual framework is the context in which the educational technology is implemented. The contextual factors that may influence the implementation of an initiative, such as a one-to-one iPad tablet initiative, are technology reform efforts, administrative support, and school control. Secondly, the conceptual framework diagram shows that characteristics that may also influence implementation of such an initiative. Characteristics include the availability of computers and tablets, and influence by age, experience, and generation. Thirdly, the SAMR model categorizes uses of technology in teaching and learning activities by whether they involve Substitution, Augmentation, Modification, or Redefinition. The SAMR model is used in this study to categorize observed and reported teaching and learning

activities. Lastly, the context, teachers, and SAMR may all influence teachers' and students' perceptions of effect of educational technology on students' learning. The literature began with an explanation of critical realism, the worldview that frames this study. Following sections provide further explanation of the conceptual framework as informed by existing literature.

Use of Technology for Instruction and Related Context

Technology reform efforts. Policy and instructional reform efforts that focus on student learning and teacher preparation (Hess, 2015) and educational policy (Tyack & Cuban, 1995) have been initiated for decades. Reform efforts are as much about progress as they are cyclical (1995). According to Tyack and Cuban (1995), half of reform efforts are meant for progress, and half of reforms are cyclical and re-emerge every so often. But unlike policy reform that is cyclical (1995), technology reform efforts tend to be more progressive due to the progress of the technology itself (Reidel, 2014). Hess (2015) argues that common sense school reform starts by bringing learning environments in to the twenty-first century by incorporating technologies that can enhance learning.

School reform is defined as the way that education is changed (Manuel, 2013). Reform efforts involve the set of activities that are planned for school systematic change with a goal in mind. One reason for continued reform is that education does not remain static (Manuel, 2013; Watkins, 2015). Public School administrators are continually attempting to improve education under school

boards that desire the best education possible for children (Watkins, 2015). In addition, reform efforts focus on the gaps between educational setting and cultural influences of the stakeholders involved in education (Watkins, 2015). Educator reform is often focused on widespread cultural influences and for good reason; school board members (including those at the state, and sometimes federal level) are elected public servants. Members are representative of culture, and often seek to take that culture to the betterment of schools (2015).

Such a cultural influence on reform is not, however, always guaranteed to be in the best interest of students (Hopkins, 2013). Reform efforts at the local level that are influenced by public servants often initiated because the school administration is too quick to adopt an effort that may be seen as culturally popular (Watkins, 2015). It should be up to the administration, as well as teaching and support staff, to engage in and push for school reform that has maximum effect on student learning and achievement (Manuel, 2013).

Private and independent schools operate without the oversight of a central district office, and therefore reform efforts are largely left to the building-level administrators. Private schools have more control over initiatives, while at the same time, they have fewer resources (Davies & Davies, 2014). Although private and independent school administrators must also engage in reform efforts to maximize learning and achievement (Manuel, 2013), they should especially consider the impact of the reform as to recognize the lesser amount resources available compared to public schools.

Computer and tablet reform efforts are one type of reform effort that is influenced by culture. Over the last fifteen years, computers and tablets have been widely accepted for personal use across the country (U.S. Department of Education, 2016). As computer and tablet use has become prevalent, the devices were adopted for use in schools by teachers and students. Reform efforts in schools involved the implementation of computers and tablets to affect student learning.

Early computer adoption. Integrating computers and tablets in the classroom began with personal computers, which became available as a technology tool during the 1980s (Muir-Herzig, 2004). Generally, students were able to access a computer lab within the school environment in order to learn basic typing skills, as well as have access to supplemental learning tools that mimicked game-like scenarios that both caught student's interest and provided individualized instruction. Computer labs were separate classrooms of computers to which students traveled in order to access the computer devices. Efforts were made to provide every student, or nearly every student, with a personal computer as part of instruction. Common uses of the computers were word processing, mathematical computations, and game-based learning programs (Muir-Herzig, 2004). Benefits to students and teachers included accessibility, school image, freeing up classroom space, and ability to individualize instruction (Muir-Herzig, 2004). Obstacles to implementation included technological failures or glitches, bulky equipment, diverse student

knowledge of how to use the devices, and cost (Bauer & Kenton, 2005).

There were also several issues within implementation (Hew & Brush, 2007; Lei & Zhao, 2007). Each school, district, or program had a different scenario, or definition, of the computer integration efforts. There was no widespread effort to determine how many computers were deemed appropriate for school and classroom use. The ways that students were using the computers were too varied for research to focus on particular uses and determine types or levels of positive impact on student learning. As new uses were developed, schools were quick to experiment and adopt computers without research or focus on best practice (Bauer & Kenton, 2005). What seemed to schools as a good idea actually had very little backing in research (Hew & Brush, 2007).

Laptops. Around the turn of the twenty-first century, laptops became popular in schools. As laptops on carts replaced computer labs, students were able to use the computer devices in their own classrooms and sometimes at their desks instead of traveling to a separate computer lab. Laptops were used the same as the computers in computer labs, with students using software on the laptops mainly for word processing and learning-based software (Fried, 2008; Grimes, 2008; Grimes & Warschauer, 2008; O'Hanlon, 2007).

Laptop integration in the school learning environment was initially seen as beneficial due to the portability of the devices, which were often housed in carts that were easily transported, or housed in particular classrooms (Fried, 2008; Grimes, 2008). The ability to free up classroom space previously housing

computer labs was seen as an additional incentive to administrators who needed that additional classroom space (Freid, 2008). However, laptop adoption initiatives were also met with opposition, as school leaders noted lack of machine durability, ease of theft, and confusion in scheduling laptop devices as setbacks (Fried, 2008).

By the late 2000's, administrators began to praise in-class laptop use, claiming benefits such as increased interactions between teachers and students due to the smaller size of laptops, more interest in learning when students had a laptop device, and greater motivation to perform well (Freid, 2008). Additionally, higher levels of student collaboration, communication, and on-task behaviors were noted as strengths (O'Hanlon, 2007).

However, there were also unfavorable opinions of using laptops in the classroom. Teachers also claimed that the devices were distractions in the learning environment, difficult to control from a security and monitoring standpoint, and were generally not necessary for learning and achievement (Freid, 2008). Fried (2008) indicated that laptops posed a distraction to both teachers and students (Eid & Al-Zuhair, 2015; Ferguson, 2016; Karsenti & Fievez, 2013; Rossing, Miller, Cecil, & Stamper, 2012).

Other research focused on laptop integration in various socio-economic statuses and school settings. Grimes & Warschauer (2008) studied the inclusion of laptops in three socio-economically diverse schools. The study used test scores after three years of implementations to determine that students with in-

class laptop use scored higher than students without, regardless of school context. Grimes and Warschauer (2008) noted that no matter the setting or ability level of the individual child, the result was fairly consistent; students who used laptops were at a disadvantage after the first year of laptop use compared to non-laptop users, but students who used laptops were at an advantage after the second year of use (Grimes & Warschauer, 2008). These results may have been due to ongoing teacher training and professional development, shifting paradigms surrounding in-class laptop use, and familiarization with the regulations and norms regarding the devices themselves (Grimes & Warschauer, 2008).

There is no uniform policy or procedure when speaking of in-class laptop use (Freid, 2008). Some teachers and student may use laptops only once or twice a week, whereas other teachers and students are nearly integrated with a one-to-one initiative, to be described next in this chapter.

One-to-one laptops. One of the outgrowths of integrating laptops into the classroom environment involved one-to-one laptop initiatives, where each student was supplied with a laptop as part of daily instruction and learning. Although the one-to-one laptop initiatives were received with praise and support, there were also reasons for concern and challenge (Donovan, Hartley, & Strudler, 2007; Garthwait & Weller, 2005; O'Hanlon, 2007; Warschauer, 2006).

Similar to the debate in previous laptop environments that did not involve one laptop for each student, supporters of one-to-one initiatives perceived higher

levels of student collaboration, greater teacher abilities to differentiate instruction, and less off-task behavior by students (O'Hanlon, 2007). Additionally, student interest, 21st-century learning skills, deeper writing, and the ability to find and create multi-media were seen as benefits from such initiatives (Warschauer, 2007). In the classroom, students who participated in a one-to-one laptop initiative were found to have better problem-solving skills and writing abilities (Lowther et al., 2003). Outside the classroom, students were better able to take education from the classroom to the community (O'Hanlon, 2007). Students were more connected to the world around them, given the experiences that technology could provide in learning (Donovan et al., 2007).

And, similar to the debate about banks of computers in the classroom, some educators noted challenges from one-to-one initiatives, such as technological issues, increased management, and unnecessary time consumption in planning for the increased technologies (Donovan, Green, & Hartley, 2010). Additionally, researchers noted the lack of higher standardized test scores, cost, inability to erase achievement gaps, and a lack of solid plans regarding professional development and staff buy-in as issues schools might expect to encounter (Warschauer, 2006). However, researchers concluded that the benefits most likely outweighed the challenges. Dunleavy, Dexter, & Heinecke (2007) studied the typical use, value, and challenges in the one-to-one laptop environment. They concluded that the one-to-one laptop program added transformative value to students, which was a greater asset than the professional

development necessary for such an initiative.

Several researchers have described and identified ways in which schools utilized a one-to-one laptop initiative (Dunleavy et al., 2007; Donovan et al., 2010; Jing, 2008). Jing (2008) found that students used their laptops for a variety of tasks, including word processing, work assignments, reading, communication, collaboration, research, and organizational and time management. Dunleavy et al. (2007) found similar uses, but also noted that students benefitted from a transformative value when using the device, particularly in the area of accessibility to information. In contrast, Donovan et al. (2007) found a range of uses among three different schools. Based on the range of participants, each of these studies identified uses, but underscored that uses varied among schools.

A one-to-one laptop initiative also affected the school culture (Jing, 2008). Certainly, cyberbullying and other related discipline issues caused great concerns about school climate and culture. Additionally, teachers reported that, while there may be less off-task behavior that is noticeable in the physical classroom, there may be just as much off-task behavior with the computer, if not more (Donovan et al., 2010). Students often discussed topics not related to the task and use the learning tools for purposes other than the intended learning activity.

Certain values surrounding teaching and learning influenced integration in one-to-one laptop initiative (Garthwait & Weller, 2005). Educators who believed

that classrooms should function autonomously tended to support a one-to-one initiative among their peers. Additionally, educators who were trained in differentiation, where the student is provided individual material designed to meet their specific learning needs (Levy, 2008) tended to be more supportive of a one-to-one initiative than educators who were not (Garthwait & Weller, 2005).

One-to-one tablets. One of the most recently available technologies for classroom use is tablets, which are touchscreen devices that run off of app software. Tablets became popular due in part to their portability and customization. The simple, yet powerful, devices catered to the needs of the twenty-first century population, focusing on collaboration, communication, and instant gratification (Chou et al., 2014; Murray & Olcese, 2011). Given the ways tablets satisfy those needs, some argue that tablets are, in fact, better for education than traditional computers. Walters & Baum (2011) indicate that access to a larger number of applications than traditional computers and the ability to replace curricular textbooks as two major advantages to tablets over computers. Additionally, the size of the tablet devices and their portability negate the need for a physical room to store the devices, as compared to a traditional computer lab (Murray & Olcese, 2011).

The physical features of tablets lend well to education (Barack, 2010, Diemer et al., 2013; iPad, 2015). The convenient size of the tablets allows for easy storage and portability between home and school, as well as movability within the classroom. In higher education, portability of the device is important,

as students often travel between buildings for courses (Rossing et al., 2012; Wakefield & Smith, 2012). The touchscreen allows for greater interactivity, and tablets are appropriate for graphics and visual arts creation (Chou et al., 2014). The integrated photo and video capabilities allow for editing and sharing opportunities in ways that are much more seamless than the computing predecessors (Diemer et al., 2013). But perhaps most of all, tablets encourage collaboration in a real-world, live environment, which may mimic the work environments that students will be expected to enter (iPad, 2015).

One distinct difference between tablets and previous technologies is that tablets are utilized commonly at all grade levels, including higher education (Eid & Al-Zuhair, 2015; Rossing et al., 2012; Wakefield & Smith, 2012). The primary difference in adoption at the collegiate level compared to the K-12 district level is that usage in higher education is mostly by choice of the student learner instead of the academic institution (Rossing et al., 2012; Wakefield & Smith, 2012).

Tablets were largely introduced at all levels of education starting around 2010 (Chou et al., 2014; Eid & Al-Zuhair, 2015; Karsenti & Fievez, 2013). Research identifies uses (Karsenti & Fieviz, 2016; Murray & Olcese, 2011; Shah, 2011; Smith & Santori, 2015; Wakefield & Smith, 2012) and perceptions about whether they are a valuable tool in the classroom (Chou et al., 2014; Karsenti & Fievez, 2016; Kontkanen, Dillon, Valtonen, Eronen, Koskela, & Vaisanen, 2016; Singer, 2015, Smith & Santori, 2015; Thornwaite, 2016; Walters & Baum, 2011). Recent research reports perceptions of student learning and achievement from

the perspective of students, teachers, and administrators (Chou et al. 2014; Diemer et al., 2013; Ferguson, 2016; Karsenti & Fievez, 2013; Singer, 2015).

The most common beneficial uses in the learning environment are portability, access to information, and completing coursework by the using online resources and textbooks (Karsenti & Fieviz, 2016; Smith & Santori, Kontkanen et al., 2016). Students are able to take tablets from class to class instead of carrying bulky and cumbersome textbooks between classes. They are also able to immediately access materials, including course materials and other reference materials. Information such as word definitions or grade reporting software can also be accessed quickly and efficiently, without spending time toggling between technology devices and paper course materials (Karsenti & Fieviz, 2016).

Studies have also reported perceptions of the usefulness of tablets in the classroom (Chou et al., 2014; Karsenti & Fievez, 2016; Kontkanen et al., 2016; Singer, 2015, Smith & Santori, 2015; Thornwaite, 2016; U.S. Department of Education, 2009; U.S Department of Education, 2010; Walters & Baum, 2011). Chou et al., (2014) and Smith (2015) found that students found the tablet useful for completing coursework. Karsenti & Fievez (2013) reported that students found usefulness in quality of student productions and creativity, as well as for completing coursework. The U.S. Department of Education (2010) indicated student creativity as a particularly useful outcome of using tablets. Thornwaite (2016) also found that tablets promoted student learning, primarily by making the student responsible for his or her own learning through creativity. The U.S.

Department of Education found that tablets allowed teachers and software to deliver more personalized content and lessons while allowing students to learn at their own pace and ability level. In contrast, however, Dimer et al. (2013), and Walters & Baum (2011) found that students did not find a high level of usefulness in the classroom.

A suggested impact on the perception of usefulness in the classroom has to do with student training and support (Karsenti & Fieviz, 2016; Dogan & Almus, 2014; Singer, 2015). Students and teachers who have been trained and provided professional development have been more apt to describe the devices as useful in the classroom (Singer, 2015). Dogan & Almus (2014) reported that teacher attitude towards the initiative and training were critical to the perceived success of the initiative, and therefore the primary focus of early professional development must include a thorough explanation of the initiative and attempts to excite staff members. Similarly, Karsenti & Fieviz (2016) found that teachers who did not perceive tablets as a useful tool were not adequately or properly trained.

Many who favored the previous technological reform initiatives may simply retool the existing arguments for a particular technological initiative; on-task behavior, multimedia creation, and deeper thinking order as it relates to real-world skills (Diemer et al., 2013; Wakefield & Smith, 2012; Warschauer, 2006; U.S. Department of Education, 2010). Students in higher education report that attention to tasks at the individual or group level were enhanced while using the

device (2013). The customization of the learning environment can easily lead to differentiated instruction (Chou et al., 2014; U.S. Department of Education, 2010), devices come with a plethora of already-installed apps that enhance creativity, and the interactivity of the devices can produce better thinking and reasoning ability, all while at the same time hold the interest of the students (Diemer et al., 2013). The vast number of apps and resources alone can contribute to a differentiated learning environment, regardless of grade level (Chou et al., 2014; Smith & Santori, 2015; Thornwaite, 2016). And by simply using the tablets, students are better prepared for the world around them in the years to come (U.S. Department of Education, 2010).

Using tablets in schools does not seem to be without challenges. Nearly every study that gathered data from teachers and students reported student distraction as a major opposition to using tablets (Diemer, 2013; Eid & Al-Zuhair, 2015; Ferguson, 2016; Karsenti & Fievez, 2013; Rossing et al., 2012, Smith & Santori, 2015, Singer, 2015). Students and teachers alike noted that the devices were highly likely to cause a distraction since they were readily available and playing games was an option (Eid & Al-Zuhair, 2015; Karsenti & Fievez, 2013; Singer, 2015). In addition, Karsenti & Fievez (2013) found that students were more likely to be off-task than on-task, although it did not impact how much the teacher integrated tablets in to instruction. Other challenges include dependence on the tablet (Eid & Al-Zuhair, 2015; Karsenti & Fievez, 2013; Diemer et al., 2013), and difficulty reading and writing on the tablet (Diemer, 2013; Ferguson,

2016; Karsenti & Fievez, 2013, Singer, 2015).

From a security standpoint, the devices are not as easily monitored by teachers, as students are likely using the tablets differentiated to unique needs (Chou et al., 2014; Dogan & Almus, 2014; Karsenti & Fievez, 2013). Students can more easily hide undesired applications quickly, or quickly toggle between the application they are supposed to be using and the undesirable one that they actually are (Murray & Olcese, 2011). Some could claim that the devices are over-stimulating, or that they produce responses themselves instead of demand learning from students (Walters & Baum, 2011). Teachers respond that the devices can be highly distracting to students (Chou et al., 2014; Wakefield & Smith, 2012). Teachers also report a strong anxiety about implementing use of the tablets, as the devices are “completely new” (Chou et al., 2014, p. 138). Other concerns include planning time and increased Information Technology (IT) support (2014).

There are other considerations as well, such as management of the devices, which often require numerous updates and frequent charging (Walters & Baum, 2011). Schools must consider the level of security that can be custom installed; for example, whether students should be able to use one app at a time, or given the flexibility to change between applications (Chou et al., 2014). Perhaps the most important consideration is that the shift between a computer and a tablet device is sure to demand ample professional development and ongoing support, for everything from how to use the tablet devices to how to best

integrate in the classroom learning environment (Dogan & Almus, 2014; Eid & Al-Zuhair, 2015; Karsenti & Fievez, 2013; Murray & Olcese, 2011). Teachers report that professional development is necessary to implement such an initiative (Chou et al., 2014; Karsenti & Fievez, 2013; Singer, 2015; Smith & Santori, 2015). Schools will need to upgrade their Wi-Fi capabilities, as well as make policies and decisions based on how devices are used, if students bring devices home, and repair and replacement costs. These are all important considerations to be made at the district or building level.

Computer and tablet program evaluation in private and independent schools. Critical to any reform initiative is a program evaluation that determines the effectiveness of the initiative (Hall & Hord, 2011). Literature has emphasized the importance of developing, articulating, and communicating a shared vision of the reform in general (Tearle, 2004) and school planning and vision (Fishman & Pinkard, 2001; Hall & Hord, 2011; Lim & Khine, 2006). A thorough program evaluation will highlight the successes or shortfalls of taking the vision to reality (Posavac, 2015; Royse, Thyer, & Padgett, 2015; Stake, 2013).

Often, a program evaluation should be completed on a reform initiative that was expected to impact student learning (Posavac, 2015; Royse et al., 2015). The program evaluation will estimate unmet needs (Posavac, 2015), measure the outcomes of the program (Posavac, 2015), and the program participants (Posavac, 2015; Stake, 2013). Organizations need program evaluations for reform efforts in order to determine effectiveness (Royse et al., 2015).

A common list of program evaluation attributes is as follows:

- Assess the needs of the program participants
- Examine the process of meeting the needs
- Measure the outcomes of the program
- Integrate the costs, needs, and outcomes

(Posavac, 2015; Royse et al., 2015)

In addition, a program evaluation may be done with qualitative methods, quantitative methods, or mixed methods (Royse et al, 2015). Research has included a number of program evaluations with one-to-one iPads (Chou et al., 2015, Singer, 2015; Smith & Santori, 2015; Thornwaite, 2016), which is necessary to determine the effectiveness of the initiative.

School control. To date, no program evaluation on a one-to-one initiative has been completed in a private, parochial, or independent school. Over the last ten years, private, parochial, and independent schools have increased in both numbers and size (Associated Press, 2016; U.S. Department of Education, 2016; Wisconsin Department of Public Instruction, n.d.). From 2011 to 2014, enrollment in American urban charter schools increased 197,198, while at the same time, urban area public schools enrollment decreased 187,673, suggesting that a nearly equal number of students left public schooling for charter schools (Associated Press, 2016). National enrollment trends show a similar increase in overall private school enrollment, up 14% in the last ten years (U.S. Department of Education, 2016).

In contrast, in the local state of Wisconsin, enrollment has been down in the last ten years both in public school by 0.5% and in private schools by 14% (Wisconsin Department of Public Instruction, 2016). Although it is possible that Wisconsin does not follow the national norms due to the early emergence of charter schools (Wisconsin Department of Public Instruction, 2016), there is no clear indication of why Wisconsin does not align with national trends.

Private, parochial, and independent schools often have more autonomy and fewer resources than public counterparts (Davies & Davies, 2014). Davies & Davies (2014) state, that “critics have frequently argued that, in contrast to state schools, private schools use resources efficiently because their autonomy gives them freedom to make efficient choices in response to market pressures.” If anything, program evaluation is critical in non-public schools in order to ensure that resources are put to effective use and that reform efforts are positively impacting elements of schooling.

Factors Affecting Teachers

Availability of computers and tablets. Educational technology is the practice of using technology in the classroom by teachers and students with the primary goal to enhance the teaching and learning process. The term instructional technology is a relatively new term (Januszewski & Molenda, 2013), but is generally used to describe technologies as used in the classroom since the use of computers in the mid-1980s.

Over the last fifteen years, there has been an increased use of technology in the classroom, primarily in the form of computers, laptops, and tablets that have been purchased by schools for students and teachers to use as part of instruction (Herald, 2016; Reidel, 2014; Smerden, Cronen, Lanahan, Anderson, Iannotti, & Angeles, 2000; U.S. Department of Education, 2010). In 1999, eighty-four percent of public school teachers reported having at least one computer in their classroom (Smerden et al., 2000). In addition, thirty-six percent of teachers had one computer in their classroom, thirty-eight percent reported having two to five computers in their classrooms, and ten percent reported having more than five computers in their classrooms (2000). These computers were stationary machines that students would have to travel to in order to use. For this reason, it would be unlikely for every student to have one in the school environment. By contrast, in 2009, ninety-seven percent of teachers had one or more computers located in the classroom every day, while fifty-four percent could bring laptop computers in to their classroom (U.S. Department of Education, 2010). Laptops were emerging as a form of computer that was smaller and portable, but essentially performed the same as a computer as described above in terms of function.

In addition to the use of computers, internet access was unavailable for ninety-three percent of the computers located in the classroom every day and for ninety-six percent of the portable laptop computers. There was no reported internet access in 1999 (Smerden et al., 2000), and at that time the ratio of

students to computers in the classroom was 5.3 to 1 (U.S. Department of Education, 2010).

In 2014, five years later, a third of K-12 public and private students had access to a computer or tablet in their school (Reidel, 2014). These devices were reported to be tablet devices in addition to desktops and laptops, which prior to this point were the only form of computers to which students had access.

Increasingly, schools have been moving to provide students with their own laptop computer, netbook, or digital tablet (Herold, 2016; Reidel, 2014). Schools purchased more than twenty-three million devices for classroom use in 2013 and 2014 alone (Herold, 2016), which is astounding considering that there were just short of fifty million total enrolled students in K-12 during each of those years (U.S. Department of Education, 2016). In recent years, tablets have emerged as the devices of choice for many schools (Herold, 2016; Karsenti & Fievez, 2013; Thornwaite, 2016; Walters & Baum, 2011).

Influence by age and generation. Computers and tablets have increased in the classroom substantially in the last fifteen years. Students today are utilizing technology in both home and school situations; this goes along with an increase in use in of computers and laptops by today's youth, as opposed to older generations (Bolton, Parasuraman, Hoefnagels, Migchels, Kabaday, Gruber, Loureiro, & Solnet, 2013; Bradley, Goodman-Deane, Waller, Tenneti, Langdon, & Clarkson, 2013; O'Brien, Rogers, & Fisk, 2012; Zickuhr & Madden, 2012).

Bolton et al., (2013) found that today's young adults use social media more than other generations due to their prior experience as children. Zickuhr & Madden (2012) found that ninety-seven percent of adults ranging from 18-29 years old use the internet, with ninety percent of those users also on social media. Zickuhr & Madden (2012) also found that technology use by people in all generations has increased since 2000.

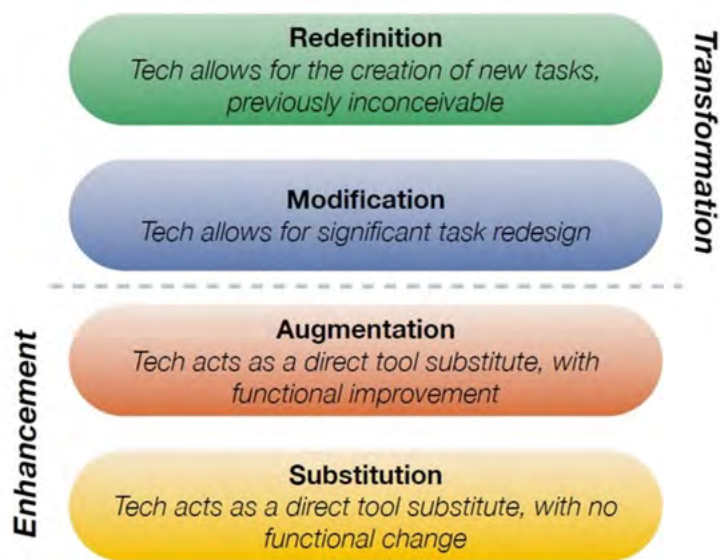
Similar findings were reported in a more general study measuring reported use of smartphones and tablets. Instead of surveying specific uses such as internet and social media, Bradley and colleagues (2013) asked generations of users to report the non-use of any technology, such as never having used a smartphone or tablet. The findings were strikingly similar to the survey or use by Bolton et al. (2013), in that only 1.8 percent of individuals ranging from 13 to 49 years old reported not using any technology.

However, not all studies indicate that age correlates with technology use. O'Brien et al. (2012) found that prior experience with technology is the most common attribute for utilization of technology, rather than age. O'Brien, et al., (2012) argue that since older adults are more aware of prior knowledge, the only difference with technology use by generation was how individuals encountering problems with using the technology attributed the reason for the problem. Because adults are more aware of what they know and what they do not know, they may be less likely to use a tablet device, because they recognize that there is a large learning curve that could potentially be difficult. Younger generations,

on the other hand, are less likely to be aware of the learning necessary and instead just ‘jump in’ (O’Brien, et al., 2012). Essentially, younger generations could be more likely to use technology, such as computers and tablets, as they are less afraid to try something that they do not know; this factor could be relevant in how students and teachers may differ in implementing tablets in the classroom.

SAMR.

Figure 2. SAMR Model



Also aiding the analysis of this study is the SAMR framework. SAMR is a hierarchical algorithm in which each level in the hierarchy demonstrates how technology integration impacts learning associated with specific activities (Puentedura, n.d.). SAMR stands for a series of four descriptors of how the technology impacts learning activities:

S: Substitution – *Technology acts as a direct tool substitute, with no functional change. The technology is simply used as a substitute to a similar task involving no technology.*

Examples:

- *Podcast lectures instead of other in-class lectures, where the lecture is not dependent on time or space;*
- *Online worksheets, or where one is simply completing coursework online in a similar format, albeit digital, to the format in print media;*
- *Online, real-time word processing instead of dictation by hand or computer;*
- *Delivery of YouTube video content instead of broadcasts from a single TV (Romrell, Kidder & Wood, 2014; Hockly, 2012).*

A: Augmentation – *Technology acts as a direct tool substitute, with functional improvement. Although the computer technology is still a substitute for other modes of interaction, there is a benefit to using the technology over not using the technology.*

Examples:

- *Using mobile text functions to engage in conversation instead of engaging in verbal, face-to-face conversation;*

- *Provide movies to students as a walking guide when exploring a scientific process instead of a guided tour, or reading about a scientific process;*
- *Real-time collaboration when individuals are in different places, instead of all individuals in a single place (Romrell, Kidder & Wood, 2014; Hockly, 2012).*

M: Modification – *Technology allows for significant task redesign. The outcome of the task is likely to exceed the outcome had the technology not been available.*

Examples:

- *Simulation or reconstruction of scientific process or event, instead of an actual reconstruction that may take more time, or a published explanation / set of pictures to be read;*
- *Online module for speech and debate in which students access and interact with speech and debate coaching virtually;*
- *Ability to re-record presentations or demonstrations (Romrell, Kidder & Wood, 2014; Hockly, 2012).*

R: Redefinition – *Technology allows for the creation of new tasks, previously inconceivable.*

Examples:

- *Treasure hunt using GPS technology in which students are locating pre-programmed GPS points via their mobile devices or using the GPS function to record where the event or item in the treasure hunt was located;*
- *Explore a city or country with Google Earth; seek out and include interviews with people who have visited the local environment, adding own commentary and perhaps movies that synthesize the place being explored;*
- *Collaborative simulations of live events, such as an a virtual online baseball game in which many individuals are simultaneously collaborating in what would normally be a three-dimensional activity (Romrell, Kidder & Wood, 2014; Hockly, 2012).*

Puentedura (2006) categorizes the four descriptors into two categories; enhancement and transformative. The technology can either enhance the task design, or it can transform the task the design. Transformation is more significant than enhancement. Puentedura (2006) describes 'Substitution' and 'Augmentation' as enhancement; the technology enhances the learning activities

and objectives. 'Modification' and 'Redefinition' are described as transformative; the technology allows for a transformational change in the way that the learning activities are designed and executed.

The SAMR model is often used when discussing instructional technology by researchers (Hockly, 2012; Jacobs-Israel & Moorefield-Lang, 2012; Romrell, Kidder, & Wood, 2013). According to Romrell et al., (2013), evaluating the extent to which of each of the four levels of SAMR are implemented in an instructional setting may serve as an indicator of increase in student learning. The more activities are labeled as 'Modification' or 'Redefinition,' the greater the possibility that student learning has been affected as compared to learning without the device. However, if a substantial number of activities are labeled as 'Substitution' or 'augmentation,' then learning has not likely increased as compared to learning without the technology. Similarly, Hockly (2012) and Jacobs-Israel & Moorefield-Lang (2012) found that by using the SAMR model to evaluate learning activities, teachers can be better aware of ways to best use a technology device such as a laptop or a tablet to potentially increase student learning.

Hockly (2012) found that teachers are most likely to engage students in tasks with tablets that would be categorized as 'Substitution' or 'Augmentation.' Jacobs-Israel & Moorefield & Lang (2012) also found that teachers were more likely to incorporate tablets into activities that would be categorized as

‘Substitution’ or ‘Augmentation,’ but further hypothesized that the effect on learning would be minimal, if any, as compared to tasks that would be categorized as ‘Modification’ or ‘Redefinition.’ Romrell et al. (2013) indicated that technology-enhanced tasks within all levels of the SAMR model could potentially have positive effects on student learning, but that the potential effects would be influenced by other factors, such as the personalization of the activity to the student and the extent of the collaboration with other students that often occurs within the activity categorized in the higher two of the four descriptors on the SAMR model.

We know that effective teaching strategies lead to learning (Grigorenko & Sternberg, 2016). Teachers that routinely include analytical, critical thinking, and problem-solving in their practices realize a higher level of student engagement and achievement (2016) than those who do not. In addition, self-regulated learning, which is the process through which individuals become proactive seekers, generators, and processors of information can lead to student achievement (Zimmerman & Schunk, 2012).

Self-regulated learning can be a positive strategy for students who are of appropriate age and maturity to learn independent of teacher direction. (Zimmerman & Schunk, 2012) Middle school-aged students would certainly be considered appropriate for self-regulated learning (2012), albeit teacher-directed. The ‘Modification’ and ‘Redefinition’ descriptors, as examined above, often

involve self-regulation, independence, and problem-solving. Although there has been no research on the effect on student learning as a direct result of the transformative descriptors in the SAMR model, it appears that prior research about effective teaching strategies could be related to the teaching activities categorized in to the SAMR model.

Perception of the Effect of Technology on Student Learning

Students and teachers have indicated perceived effects on student learning and achievement when using tablets (Chou et al. 2014; Diemer et al., 2013; Ferguson, 2016; Karsenti & Fievez, 2013; Singer, 2015). Notably, prior research has found no perceived increase in learning and achievement. Instead, the researchers list ways that students use the devices in the classroom and note that the ways in which students and teachers use the tablets could possibly impact learning (Ferguson, 2016; Karsenti & Fievez, 2013, Korkanten et al., Smith & Santori, 2015). Ferguson (2016) and Karsenti & Fievez (2013) found that besides enjoying their technology initiatives, students reported that the iPad helped them learn by being portable and providing easy access to information. Both Deimer (2013) and Smith & Santori (2015) found that students were helping each other learn the devices, which the researchers categorized as enhancing the perception of student learning because students were learning about the devices themselves. Chou et al., (2014) found that students reported a more focused learning environment, which led to students' own perception of

increased student learning, but that perception was not triangulated by teachers because they were not asked. In contrast, teachers and students reported in the study by Karsenti & Fievez (2013) that tablets decreased learning and achievement, although no explanation was given as to why.

Program Evaluation

At the core of schooling is student learning and achievement. If students are not learning, then schooling is not successful (DeMonte, 2013). As children progress from toddler age through adolescence, the strategies that children use to memorize, conceptualize, reason, and solve problems become increasingly sophisticated (Bransford, Brown, & Cocking, 1999; Entwistle & Ramsden, 2015). The classroom environment should match the child's growing ability to perform ever more challenging thinking and learning tasks.

Children learn through creativity, which is defined as a process in which students produce something original in order to accomplish a learning objective. (Grigorenko & Sternberg, 2016; Zimmerman & Schunk, 2012). Effective teachers invoke student creativity in order to help students make connections to new material (Alderman, 2013; Bransford et al., 1999; DuFour & Marzano, 2015; Entwistle & Ramsden, 2015). Tasks that encourage students' creativity also increase their motivation and self-regulation when learning (Shell, Hazley, Soh, Ingraham, & Ramsay, 2013). When evaluating a technology reform effort, particular importance should be placed on the determining if the reform effort

allows students to create in order to develop knowledge. Reform efforts should implicitly invoke student creativity, but should also allow for synthesis between teaching strategies ability for students to create (Shell et al., 2013).

Good teaching also involves coaching (Bransford et al., 1999). When possible, teachers should coach students on how to self-regulate their learning so they will better understand their own learning styles (Bransford et al., 1999; Zimmerman & Schunk, 2012). A highly successful teacher who positively impacts students' learning coaches each student the way the student learns best, thereby differentiating learning to the needs of the student (Levy, 2008). When a teacher fosters self-regulated learning and differentiated learning, this critical blend encourages student motivation to learn even as the teacher motivates the student to learn the way that is best for that student (Zimmerman & Schunk, 2012).

Evaluation of teaching and learning initiatives should explore the development of the teachers because teacher training is directly correlated to student learning (Bransford, et al., 1999; DeMonte, 2013; DuFour & Marzano, 2015). According to the Bransford, et al. (1999), teaching practices and roles are different than they were in the past and therefore teachers require additional support and training in order to meet the varied needs of students. For example, to realize the notion that teachers are coaches in classroom practice, teachers need to learn appropriate coaching skillsets and strategies in order to meet the needs of students. Program evaluation should include analysis of ways that new

teaching strategies were incorporated with the reform effort to ascertain the extent to which maximum learning possibilities can be realized (Posavac, 2015).

Summary

In this literature review, I described my guiding worldview and conceptual framework, which guided this study. I examined literature in the areas of the use of computers and tablets in school, computer and tablet program evaluation in private and independent schools, factors that affect teachers, the SAMR model, and the perception of the effect of technology on student learning, which are the major themes within my conceptual framework. My study focuses on the perceived effects on student learning in a one-to-one iPad initiative, as well as identifies under what conditions the teachers integrate the technology in to their practice.

Chapter Three: Methodology

Introduction

This study explores and describes the effects of a one-to-one tablet initiative from both the student and teacher perspectives. The purposes of the study are to understand under what conditions teachers integrate a new technology initiative in their practice and to understand students' and teachers' perceptions of the effect of using tablets on student learning. The research focused on students and teachers using a single case study approach, which according to Merriam (1988) is appropriate in educational settings. According to Merriam, a case study involves "an examination of a specific phenomenon such as a...program...a process, an institution, or a social group" (Merriam, 1988, p. 9).

In this chapter, I will outline the rationale for a qualitative research approach, describe the setting of the research, explain the sample and data sources, describe data collection and analysis methods, and outline issues of trustworthiness and limitations of this study.

Rationale for Research Approach

Recently, the increasing use of computers and tablets in K-12 classrooms has gained national attention (Barack, 2010; Diemer, T. T., 2015, Fernandez, E., & Streepey, J. W., 2013; Eid, N., & Al-Zuhair, S.; Murray & Olcese, 2011;

Rossing, J. P., Miller, W. M., Cecil, A. K., & Stamper, S. E., 2012; Shah, 2011; Walters & Baum, 2011). Tablet manufacturers have provided software for the tablets so that students can complete learning-related tasks (Barack, 2010; Rossing et al., 2012). Because tablets are easier to use and less expensive than laptop computers, schools have been purchasing tablets such as iPads, Android-based devices, or smaller-scale competing brands for students, either in quantities to be shared among students or as many as one tablet for each student. Administrators may be recognizing that the available technologies are beneficial for achieving differentiated instruction and individualized learning outcomes (Walters & Baum, 2011). In a one-to-one environment, all students in particular grades or classrooms are assigned a tablet as an instructional tool that remains with the student throughout the course of study and the student is expected to use the tablet frequently for classroom-related learning.

In this study, I explored what teachers in one independent school experienced as they responded to administrators' requests to incorporate tablets in their instruction that were to be used by all students in their classrooms. I also explored how teachers and students perceived the availability of tablets affected student learning. My study addressed the following research questions:

1. Under what conditions and in what ways do teachers in a private school integrate one-to-one tablet use into their classroom practice?

2. How and in what ways do students and teachers perceive that school-provided access to students' own tablets affects student learning?

The design strategies of qualitative research, according to Patton (2015) include *naturalistic inquiry*, *emergent design flexibility*, and *purposeful sampling*. Naturalistic inquiry is “studying real-world situations as they unfold naturally” (p. 46). This study used three sources of data, all of which were appropriate to for a case study such as this evaluation of a one-to-one tablet initiative at one private school, as it unfolded naturally. This research did not affect how the one-to-one tablet initiative was implemented, although the findings of the study may impact its future development if the stakeholders involved in the initiative use the findings to inform further decision-making.

Patton (2015) defines emergent design flexibility as “open to adapting inquiry as understanding deepens and/or situations change” (p. 46). This research was designed so that unexpected or changing themes were allowed to emerge; the instruments designed and used in the process of this research were not limited to a specific set of expected data, and they allowed for flexibility as data collection, analysis, and synthesis findings evolved. Data and analyses that emerged and evolved as the study progressed are discussed in the final chapter.

Purposeful sampling is used as “cases of study are selected because they...offer useful manifestations of the phenomenon of interest” (Patton, 2015, p. 46). The phenomenon of interest in this study was implementation of a one-to-

one tablet initiative in an independent school. Discussed later in this chapter is the specific manner in which the site was selected; however, as Patton (2015) suggests that the cases for study are information-rich, a purposeful sampling strategy in qualitative inquiry is a case study.

Case study. Patton (2015) suggests that purposeful sampling in qualitative inquiry is “aimed at insight about the phenomenon, ”so the purposeful sampling for this study is not concerned about the generalization from the sample to populations of schools, teachers, or students. Stakeholders in other school settings, however, may choose to apply some or all of the lessons learned from rich descriptions and analyses from this case study to their own particular situations.

Case study research focuses on individuals and groups who engage in activities over a period of time (Patton, 2015). In this particular case study, the individuals and groups are the teachers, administrators, and students of Odyssey School. These stakeholders engaged in a one-to-one iPad initiative that was implemented over three years.

According to Patton (2015), a case study can be a method of inquiry in which a “researcher examines in depth a program...or one or more individuals...using a variety of data.” I conducted this study from the critical realist perspective because this world view helped to understand multiple participants’ constructions of the school situation well as my outsider’s view of

the context and interactions, while recognizing that there is no one truth, and that constructed truth is independent of the phenomena that is occurring. The critical realist world view allowed me to make meaning of the context of the case (as presented in the findings and discussion) and to recognize that each participant's constructed reality is not necessarily truth.

A case study approach allowed me to situate myself as a researcher and immerse myself in a particular school setting in order to understand implementation of a one-to-one tablet initiative from the perspectives of the administrators, teachers, and students as well as to observe the use of the tablets in all six class sections (Creswell, 2007). By choosing a case study approach at Odyssey School, I was able to study the specific phenomenon of the program implementation (Merriam, 1988).

A case study is useful to generate knowledge about the case or phenomenon being studied; the findings are not generalizable to populations, but rather, inform others outside of the case (Patton, 2015). I am providing enough information about this specific case and program implementation so that others who read this case can derive information to help in their own situations. As I described in Chapter One, this case study focuses on implementation of a one-to-one tablet initiative in an independent school; one of the goals of this case study is to inform stakeholders of independent schools, as this study is unusual because it was situated in an independent school.

Site selection criteria. This research focused on independent schools. Independent schools operate under less restriction and with fewer resources than public schools. Since there are an increasing number of independent schools across the US, it is important to inform other stakeholders who are interested in these types of schools of how a one-to-one tablet implementation worked in this type of setting in order to better inform decision-making. I chose the school for the case study through the following process: a) An email was sent out recruiting eligible and interested administrators of independent school sites (see APPENDIX A); b) Schools were only deemed eligible if they were past the second year of implementation of the one-to-one tablet initiative, with the assumption that the transition in to implementation had already happened.

Research setting. The school selected as the setting for this research was Odyssey School, a K-8 private parochial school in a mid-sized Midwestern city. At the time of the study, school employed 22 FTE teachers to serve the needs of 422 students. The students were 72% White, 12% Asian, 8% African-American / Black, 4% Native American, and 4% identified as “other.” Students were almost equally split between male and female. The entire teaching staff identified as Caucasian, with 60% female and 40% male. There were no para-professionals on staff. The school administrators were two Caucasian females. The principal, an ordained religious sister, was a veteran Catholic educator. The assistant principal had vast prior experience in public education. She was hired

two years prior to the conduct of the case study to take responsibility for school-wide initiatives, professional development, and to oversee education of the students in grades six through eight. Finally, a teacher who also served as the technology director was responsible for technology initiatives and instructed some courses.

Odyssey School implemented their one-to-one tablet initiative in January of 2013.

Research Sample and Data Sources

The sample for this case study included the teachers, students, and two administrators associated with six classrooms engaged in the one-to-one tablet initiative, including two class sections each of sixth grade, seventh grade, and eighth grade. Nine teachers who taught students in grades six through eight, the principal, and the assistant principal, who was the administrator chiefly responsible for students in grades six through eight, participated in this study. All 115 students in these three grades participated in this study.

Data Collection

Data collection included interviews with administrators and teachers, observations of classrooms in session, and a survey of students. I conducted interviews with nine teachers and two administrators. Additionally, I observed classes of students and teachers in the instructional settings that were involved

in the one-to-one tablet initiative. Lastly, I surveyed all 115 students in order to see what perceived effects the tablet had on student learning.

Interviews. Individual interviews with nine of the eleven teachers associated with the six classrooms elicited information about their previous experience, implementation, tablet uses, and their perceptions of the effect of the one-to-one tablet initiative on student learning. (See APPENDIX B for the Teacher Interview Protocol.) Each individual interview was conducted in the teacher's primary classroom and lasted for a minimum of forty-five minutes. The longest interview took sixty minutes. The remaining two teachers associated with grades six, seven, and eight were not interviewed because they did not use tablets in their teaching. One teacher taught Physical Education and the other taught Vocal Music.

Each interview began with an opportunity to build rapport between the individual being interviewed and me. Building rapport enhances the confidence of interviewees and increases their willingness to cooperate (Creswell, 2011). The interview began with questions such as, "how is your day going," followed up with questions designed to transition to their professional experiences, such as "how long have you been teaching?" or "how long have you been in this school?" Although these questions were useful in order for me to learn about interviewees' teaching experience and years at Odyssey School, they were also meant to build rapport.

The teacher interview included questions about previous experience, implementation of the initiative, uses of the iPad tablets, and their perceptions of student learning as a result of the one-to-one initiative. The interview questions were prompts that allowed me to hold a conversation with each teacher that included clarifying questions, if necessary. By not sticking to an exact script, I was able to gain more data within the context of a conversation. The guiding interview questions, as a guide, are as follows:

- *Previous Experience (rapport building)*: What is your previous experience with technology? With iPads? In what ways have you witnessed technology and iPads used in the classroom, previous to the initiative? What are other contributing factors, from previous experience, that have led you to where you are today?
- *Implementation (addresses research question #1)*: What was your response to the initiative? How did you implement the initiative? What were some changes to your curriculum and/or teaching strategies? What did you need to learn in order to take up the initiative? Did you feel ready for the implementation? What were factors that positively impacted or limited the implementation?
- *Uses (addresses both research questions #1 and #2)*: How are students using the devices in your class? What has been the impact on your teaching? Are you delivering content differently? What have been the impacts on the students?
- *Student Learning (addresses research question #2)*: How has the initiative impacted student learning?

Questions asked in interviews with the two administrators were slightly different than the questions asked of the teachers. In addition to questions about implementation of the one-to-one initiative, use of the tablets, observed benefits, and perceptions about the impact of the initiative on student learning, the

administrators were asked about their perceptions of teacher learning from implementation of the tablet initiative. (See APPENDIX C for the Administrator Interview Protocol.) The administrators were interviewed in their private offices in the school, and the conversations lasted between thirty and sixty minutes. The administrator interview guide included the following prompts:

- *Previous Experience (rapport building)*: What is your previous experience with technology? With iPads? In what ways have you witnessed technology and iPads used in the classroom, previous to the initiative? What are other contributing factors, from previous experience, that have led you to where you are today in terms of leading a technology initiative? What are some considerations when leading a particular technology initiative with teachers? (listed again below)
- *Leading Teachers (addresses research question #1)*: What are some considerations when leading a particular technology initiative with teachers? What were the teachers' needs? How did you help meet those needs? How did teachers respond to the initiative? Were you ready for the implementation? Were the teachers ready for the implementation? What was the change process within the initiative while the teachers adopted this new technology?
- *Uses (addresses both research questions #1 and #2)*: How are students using the devices in class? What has been the impact on your teachers in terms of their teaching?
- *Student Learning (addresses research question #2)*: How has the initiative impacted student learning?

Observations. External observations were conducted as a way to enhance, confirm or refute the data collected in the participant interviews. Patton (2015) notes that there are limitations to how much can be learned from what people say, so “participation in and observation of the phenomenon of interest is a particularly fruitful method” (p. 27). Observations focus on “activities,

behaviors, actions, conversations...or any other aspect of observable human experience.” External observations were chosen for me to be able to understand the implementation of the one-to-one iPad initiative that was not entirely possible by solely using interview data.

There were two sections each of grades six, seven, and eight which were observed during this study. A total of twelve forty-minute class sessions were observed in order to attempt to triangulate the observation data with data from teacher and administrator interviews and with data from student surveys. I observed all nine teachers as I did six sections by following the section of class as it rotated between teachers and subjects. For example, if one of the two class sections of sixth grade students progressed from math to science, I was able to observe the same class section of students while observing two different teachers. During the observations, I watched the interactions between the teachers and the students, focused on how the students used the iPad tablet devices, and observed how the students interacted with one another in regards to the tablets. I followed a protocol in order to record the data.

For the observation protocol (see APPENDIX D), I provided the two research questions, and aligned each research question with the characteristic of the tablet in education that I was looking to observe. I also recorded observation notes about student uses, teaching strategies, and student class work that

included the tablets. I also noted if each of the characteristics that Apple has identified as prominent existed within the observation.

The five characteristics of use of the iPad in the classroom (iPad, 2015) are as follows:

Content delivery. The vehicle through which educational content is delivered. Content delivery vehicles can include (but are not limited to) the following: teacher-directed content (lecture, etc.), a textbook, a video, a digital device, an electronic book, or a combination of more than one.

Personalized content. Instructional materials that are personalized to each learner. Personalization can be automated at random by computer software (such as randomized quiz questions drawing from a source bank not influenced by the teacher or the student), or pre-defined by the teacher and/or the student (where the source bank of material has been influenced by the teacher or the student).

Production. The ability to complete school-related work on a tablet device.

Creativity. A process in which students produce something original in order to accomplish a learning objective.

Flexible teaching. When the teacher engages in multiple tasks in the classroom, often interacting with more than one student to foster their learning.

Flexible teaching contrasts with using a single task, such as lecture, to deliver content to a large group of students at one time.

Student surveys. A survey questionnaire was distributed to Odyssey School students in grades six, seven, and eight to understand their perspectives about the one-to-one initiative and to triangulate the data collected in the interviews and observations. The interviews allowed me to gather data about the perceptions of the teachers and administrators. I used student surveys in order to gather individual perspectives of all 115 students. Surveys are a useful tool in order to positively contribute to research trustworthiness by triangulation (Maxwell, 2012) and are a quick and useful tool to collect data from a large sample (2012). The survey questionnaire included questions (APPENDIX E) designed to elicit students' impressions how using the tablets affected their learning.

Students were asked six questions on the survey questionnaire about their use of the iPads and perceptions of learning. Four of the questions dealt with their use of the devices and, in particular, which apps they used most frequently, how they used the apps were, what they believed the most constructive uses of the iPad to be, and what they were able to do with the iPad that they were not able to do without it. Although the questions were designed to get students to think critically about their uses of the iPad, four questions resulted in students' perceived uses of the iPad and elicited similar responses. Therefore, the

combined analysis of these four questions yielded the finding for perceived use of the iPad for each student.

I used the student surveys to understand their perspectives about how they were using the tablets, and to learn how they believed that the tablets affected their learning inside and outside of the classroom. The students completed the survey questionnaires in their homeroom classes on their iPad tablets. Because the students completed the surveys as groups within their class sections, it was possible to analyze the results by individually and by grade level.

The surveys were distributed as a simple URL web link provided to students, which led students to a Google Form. The data was collected on a secure spreadsheet, which only I could access. I then used the data from the spreadsheet in order to analyze the results.

Out of 115 students, 96 students returned the survey for a response rate of 83 percent. Since students completed the surveys in class, they responded quickly. All but three surveys of those returned were submitted within three days, and the remaining three were within six days.

Informed consent. Before any data was collected, the a plan for the full scope of the study was submitted to the Institutional Review Board (IRB) office at the University of Wisconsin-Milwaukee. As part of that process, I generated informed consent forms. Informed consent was used so that participants

understood involvement, benefit, and any risks of being involved in the study (Glesne, 2011). The informed consent forms that were submitted to the IRB on behalf of this study were the following:

- Adult Administrator Informed Consent (APPENDIX F)
- Adult Teacher Informed Consent (APPENDIX G)
- Parent – Guardian Informed Consent e-signable (APPENDIX H)
- Parent-Guardian Informed Consent traditional (APPENDIX I)
- Child Assent (APPENDIX J)

IRB Approval was received (APPENDIX K) with later request for amendment granted (APPENDIX L) to accurately update the total study participants.

Prior to the study, parents were sent a letter informing them of the study (APPENDIX M). During the study, data was stored securely using cloud-based Google software to which only I had access. Participants, identifiers, and site data were removed, and pseudonyms were assigned. The anonymous student surveys were administered via Google Forms, and only I had access to the data.

Data Analysis

I analyzed three types of data: interview transcripts, observation notes, and survey results. Each type of data was analyzed separately at first, and then all three were analyzed together in order to triangulate data.

Figure 3: Data Analysis Matrix

Participant	Background	Initial Thoughts / Actions	Perceived Effect on Teaching Strategies - Interview	Perceived Effect on Teaching Strategies - Observed	Uses - Interview	Uses - Observed	Benefits	Considerations	Problems	Perceived Effect on Learning
Jennifer Bennington										
Jeri Vonesh										
Jim Burman										
Etc...										

Interviews. Each participant interview was transcribed manually, without transcription software. I coded each individual interview in two stages: initial, and grouped (See APPENDIX N for a list of codes). I came up with initial codes by reading through each interview transcript and underlining re-occurring words, phrases, and themes. I used the concepts from my conceptual framework as a guide for the initial codes. The initial codes were then grouped in to categories of ‘parent codes’ and ‘child codes.’ The ‘parent codes’ were the categorical codes to which the ‘child codes’ were categorized under. By grouping the codes, I was able to see how the codes related to each other. After grouping, I revisited the grouped codes order to see how the codes allowed me to gain a sense of the relationship between key constructs for each individual. For example, in an interview when talking to a teacher about their background, I would have coded initially as either experience, no experience, or some experience within the data and in regards to tablets or computers. Also, I might have coded these under a different category as a benefit, consideration, or limitation, depending on the data. Later, when looking for emerging themes, I created a parent code of experience that included the children codes of experience, no experience, or

some experience. I also created a separate parent code of benefit that might have included a child code of experience or inexperience, based on the data. Sometimes, the child codes were used for more than one parent code as I found emerging themes.

I conducted a cross case analysis of teacher interviews by constructing a large matrix into which I placed quotations that I had coded by the parent codes, and color-coded each quotation by participant pseudonym. This allowed me to look both vertically through the quotations by parent code, as well as horizontally to the quotations by participant. The main categories of concepts about which I did a cross-case analysis guided the framework of Chapter Four, and emerged as follows:

- Background
- Initial Thoughts and Actions
- Perceived Effect(s) on Teaching Strategies
- Uses
- Benefits
- Concerns
- Perceived Effect(s) on Student Learning

I also analyzed the interview data through the SAMR model, which will be discussed in the 'Cross-data analysis of activities and perceived learning' section below.

Observations. Observation notes were analyzed similarly to the interviews in that I first used an initial set of codes to code the observation notes.

I then categorized the codes in to 'parent codes' and 'child codes', with the 'parent codes' being the same as the interviews. I would later use the coded data in the observations in order to triangulate what I was observing against the data gained in the interviews (described below) by placing the observed perceived effects on teaching strategies, and uses next to the data gained in the interviews in the matrix. I also analyzed the observation data through the SAMR model, all of which will be discussed in the 'Cross-data analysis of activities and perceived learning' section below.

Student surveys. The surveys were distributed as a URL web link provided to students, which directed students to a Google Form. I was able to access the returned survey data in a spreadsheet format, which showed responses by date and timestamp.

There were two kinds of analyses for the student surveys. The first analysis was to code the open-ended following questions: a) What apps do you most frequently use; b) How do you use these apps; c) What are the most constructive uses of your iPad; and d) What are you able to do with your iPad that you are unable to do without it? I coded the data similarly to the reported uses in the interviews and observations by first hand coding an initial set of codes and then grouping codes and later creating categories. After I had the grouped categories of codes, I was able to look at the data in order to dimensionalize responses as related among respondents.

The second analysis was of the Likert-scale questions that were asked to elicit responses regarding students' perceptions of how the tablets might have affected the learning. Students were asked to rank their responses on a 1-5 scale to the following questions: a) How well does your iPad help you learn in class? and b) How well does using your iPad help you participate in class? By having the Likert scale, I was able to calculate frequencies of all of the responses. I also calculated frequencies and percentages of the students per grade level for all but six respondents for whom it was not possible to determine their grade level. Since students were asked to complete the surveys in their homeroom class, I was easily able to identify which students belonged to each grade levels. I found it possible to analyze these frequencies per grade level in order to find patterns in the frequencies in order to see how, if at all, prolonged opportunity to use the iPads affected students' perceptions of the effect of the use of iPads on their learning. I did not analyze frequencies per teacher since students in each class section learned with several teachers across grade levels and thus did not allow for analysis by class section or teacher.

Cross-data analysis of activities and perceived learning.

Triangulation of data. After analyzing interview, observation, and student survey data, I triangulated across the data sources. I created a matrix that was arranged in columns by parent code and rows by teachers' pseudonym. I then inserted excerpts from observation notes in to the teaching and learning activities

section of the interview matrix described above in separate columns so I could compare similarities and differences between the interviews and observation notes. Fragments of the coded observation notes were again categorized vertically by parent code and horizontally by teacher.

I arranged the matrix of data in order to separate categories for observation and interview data for effects on teaching strategies and student uses. In this way, I could see by teacher if the observation data was similar or dissimilar to the interview data. By looking at the totality of the data, I was able to address the research questions in ways that I could not have done with only one type of data collection or only teachers, administrators, or students. The three types of data collected represent all stakeholders in this particular case.

SAMR model. I used the SAMR model in order to categorize the activities in which students were engaged with the iPad. These activities were mentioned in teacher interviews, student surveys, and my observations of class sections.

Interview, observation, and survey data that indicated teaching strategies and student uses were analyzed through the SAMR model and placed in to the most appropriate descriptor. The SAMR list was also categorized by SAMR descriptor and grade level in order to analyze against the data collected through the interviews and student surveys. I then categorized teacher comments that described teaching strategies or student uses according to the SAMR model and placed in to the most appropriate descriptor. The SAMR list was categorized by

SAMR descriptor and grade level in order to analyze against the other data observations and student surveys.

Figure 4: SAMR Data Matrix:

SAMR Level:	Reported and observed uses
S: Substitution	
A: Augmentation	
M: Modification	
R: Redefinition	

As I described in chapter two, the SAMR model is a hierarchical set of descriptors that show how student learning might be affected by engaging in activities that involve technology (Puentedura, n.d.). I analyzed each activity by the way it affected students. An example of how the data was coded is as follows:

‘Substitution’: Typing notes during lecture

‘Augmentation’: Work in online pairs to quiz each other

Modification’: Creating videos

‘Redefinition’: Working jointly on quizzes and presentations in real-time; responses are in real-time and indicated on all participants’ screens

For example, if a student was typing notes during a lecture, then the tablet did not transform learning; however, if a student was working jointly on a quiz in real-time with quiz responses indicated on his or her screen, this instant feedback would not have been possible using a prior technology.

Categorizing activities in to the SAMR model is not prescribed. Therefore, I did not always find it easy to categorize activities. Some activities were quite easy to categorize; for example, 'using the tablet to research on the internet' and 'using a calculator' are clearly substitutive activities, as students could use another device for the activity and therefore the iPad is simply substitutive in nature. Similarly, activities such as 'having immediate access to information' and 'creating videos (to use in coursework from the same device)' are something that the students would not be able to do without the one-to-one tablet technology; the technology significantly modifies how students engaged in the activity and were categorized as 'Modification'.

Many of the activities, however, were difficult to categorize. For example, I chose to categorize 'checking grades' and 'email my teachers' as activities of 'Modification' because I felt that students were not able to do these activities in real-time without the device; the ability to email or check grades during class might modify how students approached the activities in the class, as opposed to waiting until later to complete each activity. There were many activities such as these that fell into ambiguous areas that I needed to consider carefully before

categorizing, and the categorization of such will be detailed more in Chapter Four.

Issues of Trustworthiness

Subjectivity and reflexivity. Glesne (2011) cites subjectivity and reflexivity as two important considerations when doing qualitative research. Subjectivity is defined as a researcher bias, which can limit the findings of research (2011). Reflexivity, on the other hand, is an awareness of the self in the situation of action and in constructing the situation (2011).

By focusing on both my subjectivity and reflexivity as a researcher, I took necessary measures to give the study the highest level of validity and reliability possible. I triangulated the data and used my own reflexivity to try to understand that data without researcher bias or expectation. I recognized that there was no ‘right’ interpretation of data (Glesne, 2011). However, I took measures to assure that my interpretation of the data is trustworthy.

As I collected data, I continually reflected on what I noticed and why, as I reflected on my subjectivity as former teacher, and as an administrator who had previously implemented a one-to-one initiative (Glesne, 2011). I wrote memos after each interview and observation that, in part, served as a reflection as to minimize personal value judgments about what I heard and observed. For example, when I interviewed Ms. Vonesh and recognized her excitement to show

me how her students were using the iPads, I could have quickly been either impressed or unimpressed with the uses, based on what I had expected. However, I questioned my initial, neutral, impression of the data and cross-checked the data with her interview to be able to analyze what was actually happening from a research perspective. Also, after the second round of observing the same class, I memoed similarities and differences between the two observations, particularly if there was a different teacher teaching the class. This way, I was able to continually reflect on what was happening in the classroom as I progressed through the observations and interviews.

Power. There was also a potential issue of power, given my role as an assistant superintendent in the Diocese of Madison. Power is an ethical situation that the researcher must avoid (Glesne, 2011). Although the researcher can reciprocate the power by allowing the participants to understand more about themselves through the research process (2011), the issue of power should still always be addressed.

The structure of the schools in the Diocese differs from a traditional public school district. In the public setting, the central office has power over the building administrator, who holds power over the employees of the building. In the Diocese of Madison, each school is owned and financially supported independent of the Diocese, often by the parish or a number of parishes. The central office at the Diocese of Madison does not have power that affects any

operation of the school; instead, the central office acts as a resource that often coordinates events based on shared interests, or acts as a material and knowledge resource that promotes Catholic education and best practices in today's learning environments. Therefore, I am not considered a power figure in the Diocese of Madison and am free to present myself as a researcher within the school setting. Historically, the office of the Assistant Superintendent has not been seen by employees of schools as an office of power, so a pre-existing notion based on title alone does not exist.

When I first met with the teachers and administrators in the interview process, I explained that I was involved with a research project with the University of Wisconsin-Milwaukee and that I did not represent the Diocese of Madison in any capacity. I also explained to each individual that I would not be discussing the results of this study with any colleagues in my central office and that this study in no way represented a performance evaluation. I used the parent introduction letter (APPENDIX M) to present myself as a researcher to parents and students. When I was in the classroom, the students behaved as though there was not an extra observer; their behavior indicated that the students did not consider me to have power over them.

However, there is still potential for teachers and / or administrators to view my role as one of power. Even though it is impossible to completely remove this issue, I attempted to mitigate it by developing field relations as a researcher

(Glesne, 2011) in which I wholly presented myself as a researcher instead of a school administrator.

Limitations

As with all qualitative research, there are limitations to the study which cannot be avoided (Glesne, 2011). In this study, the major limitations included that the results are not generalizable, the research was conducted at a specific point in time, the inability to observe everything in all of the classes, and that teachers could have been trying to impress me favorably when I was observing them with their students in their classrooms.

This study is not generalizable to any population of private schools, administrators, teachers, or students. Case studies, in particular, are not able to be generalized (Merriam, 1988). That said, the information in this case study could still be used by independent school stakeholders in order to inform decision-making if considering a one-to-one tablet initiative. The rich and detailed analyses of data may be extrapolated to their own contexts by other stakeholders, which according to Patton (2015) shows that “one has (gone) beyond the narrow confines of the data to think about other applications of the findings” (p. 713). Stakeholders can use the analyses and findings in a meaningful way, but may consider how the findings would apply to their own situation.

This research was conducted at a specific point in time and involved reflections about events over the previous three years. Therefore, the data is longitudinal and may not be applicable to another point in time. Since the data is retrospective in nature, individuals' reflections about what occurred one or two years prior may not be completely accurate.

I was unable to observe all activities that occurred in all of the grade six through eight classes. Although the sample of classes I did observe included all teachers and all students in grades six, seven, and eight at Odyssey school who were participating in the one-to-one iPad initiative, the findings and results of this study might have been skewed by the particular activities observed. The activities may not necessarily have been representative of all activities and uses among all students and teachers. Nevertheless, my observations of class time likely yielded rich information indicative of the ways that iPad tablets were being used at Odyssey School by teachers and students at the time of the case study.

In particular, the teachers whom I observed may have been performing to impress me as an observer. It is possible that they may have been showing off pre-determined uses of the iPads instead of progressing naturally as if the observation was not being conducted. Similarly, students may have been acting differently during the observations when I was in the room. However, the data does not show that this limitation existed. For example, students were not necessarily on their best behavior while I was in the room; for example, during an

observation of an eighth grade class, a group of students took turns randomly making barking noises at each other. On another instance when I was observing a sixth grade class, the teacher apparently was tired of the students interrupting the teacher talking and raised her voice to silence the students, which would not be a typical behavior of somebody who was trying to impress during an observation.

I chose to use the SAMR model to aid in the analysis of the data. There is a danger with SAMR in that there is no context when placing activities in to the hierarchical levels. There is an suggested equivalence between the levels of any linear model with an effect on learning; however, in the absence of multiple layers of context, there is no way of knowing whether that equivalence exists.

In the next chapter, I will describe instances where the data in the interviews conflicts with the observations; particularly, in ways that teachers described uses of the tablets, although the uses were not observed. The triangulation of the data helped me to realize that the teachers were not necessarily trying new things with the iPads while I was observing. Thus, although the data does not suggest that teachers and students were performing differently from the way they normally would, observer presence is still a potential limitation of this study and must be considered when using the findings.

Summary

The purpose of this chapter was to describe the research approach, research setting, research sample and data sources, data collection methods, data analysis methods, issues of trustworthiness, and limitations. Using qualitative methodology, I used teacher and administrator interviews, observations, and student surveys in order to gather data that was analyzed to help answer the research questions. I coded the interview, observation and survey data first individually, then compared across data sources to find emerging patterns for the use of iPads and their perceived effect on student learning at Odyssey School. I will describe the patterns and themes in narrative form in the next chapter. I will then relate these patterns and themes in the final chapter and compare them to what has been discovered in previous research.

Chapter Four – Findings

Introduction

In this chapter, I will report the findings of this case study. As I began this research, I focused my interviews, observations, and surveys on the following research questions:

1. Under what conditions and in what ways do teachers in a private school integrate one-to-one tablet use into their classroom practice?
2. How and in what ways do students and teachers perceive that school-provided access to students' own tablets affects student learning?

To give context to the findings related to the research questions as stated above, the site and students of Odyssey School will be described, as will the backgrounds and previous experiences of the teachers and administrators.

I will also describe how teachers reacted to learning the devices prior to implementation based on their previous experience level with technology. I will then describe the reported perceived effects to their teaching strategies at the time of data collection.

Student and teacher uses of the iPads will be described as reported by teachers, administrators, and students, as well as benefits and concerns of the initiative as reported by teachers and administrators.

Lastly, I will describe the perceived effect on student learning as reported by teachers, administrators, and students, and analyze the uses of the iPads through the SAMR model.

The Odyssey School Site

Odyssey School is comprised of two separate buildings that are connected by series of walkways. The elementary building, which houses students in grades K-5 is located separately from the building that houses grades 6-8. Odyssey School's middle sixth through eighth grade classrooms are in an old high school as part of a complex separate from the K-5 classrooms. It was in this middle school that I conducted my research. The middle school was built about a half century ago, but has been remodeled in the last fifteen years to update furnishings and technology.

The middle school building is beautiful in sight. The classrooms are all large, and there is rich, dark wood trim that adorns all of the hallways and classrooms. There is a stone archway that drapes over the entrance to the office, which is located in the middle of the school building. The dark trim treatments combined with the modern carpet, flooring, and paint made for a clean, fresh, and pleasant look and feel. During my time at the school, I simply felt 'comfortable' in the learning atmosphere, and can assume that students did, as well.

The teachers in the middle school facility interacted independently of the teachers in the grade school facility. The two facilities seemed to operate as two completely separate teams, although sharing one school name and administration. The Assistant Principal is responsible for the administration of the middle school, and although the Principal oversees the entire school, she is primarily responsible for the K-5 building.

Each teacher has his or her own classroom. Students rotate teachers for every class, with the exception of an assigned homeroom, while the teachers stay in their classrooms. Some teachers teach among grades six through eight, and others only teach grade six, as it is the practice of the school to rotate the sixth grade students minimally and increase the frequency of rotation as students age and mature. Students are assigned to a grade-level homeroom teacher, which is where they spend part of their day. Each teacher also teaches a curricular content (subject) area, and students rotate between the teachers, similarly to a high school setting.

Since students rotate between buildings in the complex, they travel constantly with outdoor clothes and backpacks. They do not walk in straight and organized lines, nor do they all travel as a group. Each class period is forty minutes in length, and students spend five minutes in between classes.

The Administration at Odyssey decided to adopt a one-to-one tablet initiative four years ago, as iPads were beginning to emerge in classrooms

(Barack, 2010, Murray & Olcese, 2011; Walters & Baum, 2011). Funding for the initiative was secured by a payment plan through the tablet manufacturer, which allowed the school to fund the devices out of the operating budget for the school. The devices were purchased in the spring of 2013, for implementation in fall of 2013 with the students. The teachers were allowed to take the tablets home over the summer of 2013 in order to learn the devices and begin to find potential ways of use in the classroom.

Background, Introductions, and Previous Experience

In this section, I describe the administrators' and teachers' backgrounds in education, experience in technology, and attitudes about the one-to-one tablet initiative. Also, I will describe the students in Odyssey school.

Each teacher experienced a different journey throughout the initiative. Since some teachers gained employment with the school after the initiative was first launched, each teacher was at a slightly different place in terms of his or her own learning and experience in regards to the initiative.

The table below represents a summary of experience for each teacher and administrator at the time of the study. As previously noted, all of the names are pseudonyms.

Table 1. Personnel

Name	Position	Grade Level Taught	Subject(s) Taught	Total Experience Prior to 2015-2016 school year	Employed at Odyssey upon implementation	Previous Experience with Technology prior to Initiative
Amanda Palmer	Administrator			23	No	Witnessed 1:1 iPad initiative at previous school.
Virginia Wilkins	Administrator			58	Yes	Observing teachers use technology
Sylvia Acosta	Teacher	6-8	Spanish	7	Yes	Little interaction with technology in school setting due to subject area; mostly limited to computer lab for projects
Julie Bennett	Teacher	7-8	Religion	9	No	Students at previous school allowed to bring own tablets, but not 1:1 iPads
Jennifer Bennington	Teacher	6	Science, English	6	No	Heavy personal iPad use, previous experience with iPads at previous school, not 1:1
Jim Burman	Teacher	6-8	Social Studies	20	Yes	Relatively high use of technology in personal life, embraced iPad cart available to whole class prior to 1:1 initiative
Robert Burns	Teacher	7-8	English	22	Yes	Embraced technology throughout career, most previously used iPad cart available to whole class prior to 1:1 initiative
Sam Kafer	Teacher	7-8	Math	15	No	iPads at previous school, not 1:1
SuAnne Kane	Teacher	6-8	Technology	30	Yes	Leading technology initiatives as technology teacher throughout entire career.
Kimberly Klein	Teacher	7-8	Science	8	Yes	Mostly social networking. Has personal iPad.
Jeri Vonesh	Teacher	6	Math, Language Arts	22	Yes	Personal iPhone; previously used SMARTBoards but no touchscreen devices

The administrators. The Principal of the school, Virginia Wilkins, had been in the position for decades – she was consecrated religious, part of a community whose mission is education, and she had overseen the grade school

throughout her tenure. She prided herself on picking the right candidates for each job and attributed the success and growth of the school in large part to this factor. She reported that the school thrived due to dedicated and strong educators; “If I can do one thing well, it is hire; I have always had a good eye for a great teacher, and I hire well.”

Ms. Wilkins shared that her primary role in the school was to “maintain enrollment and to be sure that we always hire and retain good teachers.” When she decided that she wanted to launch a one-to-one iPad initiative at the middle school level, she hired new personnel, including a computer teacher whom she tasked with launching the initiative, followed by an assistant principal who had experience in overseeing a similar initiative in a previous position. The role that Mrs. Wilkins played in the process of implementation was to ignite the process by bringing in strong talent. She did not actively implement the initiative.

The assistant principal, Amanda Palmer, was hired by the Principal due, in part, to previous experience with one-to-one iPads at the middle school level. She spoke of “my passion for integrating technology in the classroom and watching the teachers ‘get it’ and passing that on to the students.”

Ms. Palmer had a high energy level, and I observed that she individualized her interactions with each staff member and student. She frequently stopped students in the hallway and casually conversed, or changed her vocal tone based on how she knew the student. For example, she stopped one female student in

the hall as I passed and quietly addressed the student with concern, asking, “Is today going better than yesterday?” Not but seconds later, she changed tone on a dime, addressed a large male student, nodded her head, and deepened her voice just to say, “rad shirt!” She frequently gave ‘high-fives’ to students, and engaged the teachers in casual conversations while walking through the halls or in the staff lounge. She showed care and concern for others in her interactions, and this was affirmed during our interview when she shared that she preferred to be involved in the school setting instead of governing from an office. “I love people, and I love to be among students.” When Ms. Palmer arrived at the school, the school was already in year three of the initiative.

The teachers.

SuAnne Kane. SuAnne Kane had been the technology / computer teacher at Odyssey for three years at the time of the study. She had been teaching technology at various levels and in varying capacities since 1978. She told me that she had a passion for “using new technology” and “pushing it somewhere I would like to see it grow.” She was an avid user of educational technology, both as an educator and as a current adult graduate student. She spoke of witnessing transformations in educational technology “all the way from giant computers to cell phones and iPads.” She had actively embraced technology in the classroom throughout her tenure, and was hired at Odyssey

School to implement the one-to-one iPad initiative before the tablets were purchased and distributed.

Ms. Kane's passion for educational technology was evident during our interviews. "I watched the first computers come in to classrooms over twenty years ago, and now I got to see iPads, which is a totally different type of device. It is really exciting to watch new technologies be implemented, and I sort of have been committed to seeing through the initiative as a technology teacher."

Since Ms. Kane had experience working with technology, she said it "was easy for me to learn how to use the iPad to do things in the classroom that we already do in other ways." Although she initially subcontracted with Apple professional development representatives to show teachers particular apps and uses in the classroom at the onset of the initiative, she had provided the other professional development herself to her teaching colleagues since the program's inception. Most of the professional development that she offered to teachers involved showing them ways that the iPad can be incorporated in to teaching and learning activities in the classroom.

Julie Bennett. Julie Bennett was in her first year teaching at Odyssey School, but was not new to teaching, with nine years of experience in her previous school. At that previous school, she had experience with students being allowed to bring tablets to school, but had no experience with a one-to-one initiative. Many of the students in her previous school took advantage of the

opportunity to bring the tablets to school, so she had previous experience with witnessing how students used their own devices. She told me that she was still “implementing it in the classroom . . . mostly using it to show students videos (of the content).” Although she had only been using the devices in her classroom for half of a year, she said “laptops are still more valuable than iPads, and iPads can be distracting at times.” However, she was committed to continuing to “find new ways to use it in the classroom” since her students are currently using it only to “look up information and to watch videos.”

Ms. Bennett spoke favorably of implementing the one-to-one initiative, having seen students use tablets in her previous school. She was currently assessing how students were using them in her room, and then “will continue to use them more in my lessons.”

Kim Klein. Ms. Klein, a science teacher, had been at the school for less than ten years and was part of the one-to-one iPad initiative since its inception. She said she “embraces technology for my own research or social networking” and used the iPads in the classroom “instead of showing videos.” She used apps to demonstrate concepts as an alternative to books and other media.

However, she was lukewarm to the initiative for a practical reason – many science technological applications need Adobe Flash software, which was not supported by the iPads. “Most of the technology I use and students can really

use needs (Adobe) Flash.” Therefore, most of her uses in the classroom were “a substitute for videos and an organizational tool for students.”

Ms. Klein formerly held a career outside of education, and spoke of education as her “second career,” although did not indicate what her career involved prior to education. She used technology in a variety of forms in her previous career and was “still learning how to use the iPads in my classroom without them doing Flash.”

Jeri Vonesh. I first met Ms. Vonesh when she stopped me as I was walking down the hall. She introduced herself and excitedly asked me to come in to her classroom to see what a student had created on the iPad as a learning tool. During our interview conversation, she communicated how excited she was to show how the students were using the devices: “It is so cool to see students using the iPads, even though I don’t directly use them for coursework all the time. But even though I don’t always use them for coursework, they are always using them for something!”

Ms. Vonesh had been teaching for decades. She was at Odyssey School from the inception of the initiative, and said “I’m always ready to try something new,” even though “I’m not really a techy person.” Perhaps it was not the technology itself that drove her actions in using the devices, but rather, her passion for trying out a new way to engage students in learning.

Ms. Vonesh based how she used the iPads in the classroom “from other teachers....I see what they are doing, and I think, ‘I should try that.’” She saw the initiative as a way for “students to do different things, maybe new things, and I was excited even though I didn’t really have experience (with iPads or previous technologies).”

Robert Burns. Robert Burns had been teaching Language Arts at the school for eighteen years, so he was no newcomer to initiatives. However, he approached every new initiative “based on my previous experiences.” He appreciated how the iPads had been “phased in to my classroom,” meaning that he had chosen to gradually integrate them in to the curriculum. However, he noted that the iPads “aren’t necessarily conducive in all areas of Language Arts, particularly with typing,” but he used them “for students to gather data or to read things on their own, independently.” He spoke positively of the initiative, noting that “the kids are really excited to have an iPad as their own and use it in the school.” He found some of the (online and app tools) “to be more useful than anybody can do with a set of eyes and a pen,” mostly in terms of proofing composed literature assignments and sharing resources online.

As I spoke with Mr. Burns, I found his statements to be practical and matter-of-fact. It was clear that he had experienced implementation of initiatives before, but really valued this one for the students. Mr. Burns had participated in technology initiatives including the addition of SMARTBoards, portable carts of

laptops, and portable carts of iPads. He found that the one-to-one iPad initiative was the most valuable. “It gives them a baseline, because they will use individualized technology in high school and college, and so (the iPads are) a nice choice for the students. It gives them aptitude.”

Jennifer Bennington. Jennifer Bennington was the youngest of the teachers at Odyssey, in her second year at the school and fifth year of teaching overall. She had used technology “in all of my five years of teaching,” noting that she had always had a smartphone and iPad during her teacher preparation program and teaching experience. “All I had to do was figure out how to use it in the classroom, which was pretty cool.”

Ms. Bennington spoke with an obvious passion for teaching, and a clear mission to incorporate the technology provided. “I used my prep time to figure out how to use this thing for student learning, and now I use it all the time in the classroom.” She appeared very comfortable with technology in general, so she did not have to learn the technology itself first, and then secondly learn how to utilize it in the classroom.

Ms. Bennington’s primary teaching assignment was science, much like Ms. Klein. She noted that the lack of (Adobe) Flash compatibility was a limitation, but did not stress it as a particular disadvantage. “Sure, it’s too bad that I can’t use some of the things with Flash, but we just find other stuff and make it work,” she said and shrugged her shoulders nonchalantly.

Sam Kafer. Sam Kafer taught math at Odyssey School, but previously taught science at another school. While Ms. Kafer used the iPad at Odyssey, she had previously used Microsoft products in her classroom. Ms. Kafer continually referred to the transition to the iPad as a part of her own learning. Whether it was her own transition from Microsoft to Apple products, or to 2-D models on paper to 3-D models of trigonometric concepts, “the transition is important, and I need to be able to figure out how to move from one technology to another.”

Ms. Kafer saw the iPad initiative as a way to complement the curriculum, and quickly identified that she needed to learn the Apple platform in advance of the initiative. Her sense of “knowing what I do not know” gave her an advantage in identifying where she needed to be in her own professional development before the devices hit the students’ hands. And perhaps this had been the most important for Ms. Kafer over any other teacher, as she was the only teacher with a fully online textbook.

Ms. Kafer appreciated the implementation of the iPads, noting that “the devices...make it more efficient and in-depth” in terms of student learning. She viewed the devices as helpful in the “number of activities we can do with the students, which is greater, to enhance learning,” again noting the efficiency. Ms. Kafer wanted “to stay ahead of the kids with technology and what they know,” so she embraced the initiative.

Ms. Kafer appeared excited and energetic when speaking of the initiative, but was also careful to note that with excitement also come concerns. She stated that “we had to set procedures for the students and expectations for the parents,” and “the parents had to know that we weren’t just playing games with the students.” She was instrumental in helping to set procedures for the tablet devices, such as care and use of the device as well as disciplinary actions related to the devices, which seemed to fit with her desire to be one step ahead.

Sylvia Acosta. Sylvia Acosta had taught Spanish at Odyssey School for three years. She did not use the iPads regularly in the Spanish curriculum, but allowed students to use them for reference or organization. When asked about the choice to not utilize the devices, she replied that “I teach the language through my own dialogue with the students, and I would rather do that than replace it with technology. She did utilize the technology; she said that at times, there were projects or other instances that might have otherwise necessitated a trip to the computer lab. Ms. Acosta stated that “the iPads are readily available, so it speeds things up.” And that is exactly what she used them for – efficiency and availability of information. “I was excited at first, and I am still excited; I just don’t use them for my materials.” The materials that Ms. Acosta referred to were the instructional tools in her classroom; she allowed the students to use the iPads for creation of essays or completing coursework, but did not utilize the iPads for content delivery.

Ms. Acosta also noted that she was continually learning to use her iPad from her students. She said, "...the kids teach me all about the device, something that might take me time to learn on my own." Overall, she appreciated the initiative and had been part of it from the start, but the limitations she placed on using the devices in the classroom meant that, in her opinion, "learning is not deepened or changed, really."

Jim Burman. Jim Burman taught Social Studies at Odyssey School, and although he did not disclose the exact number of years, indicated that he had done so for some time. He had school-aged kids himself, so he was used to technology in his personal life. He indicated that most of his experience with technology in the classroom involved students; mainly, helping the students to complete assignments and projects with traditional computers. When the one-to-one iPad initiative was introduced, his first instinct was to get to know how to use the devices in the classroom. "I learn slow and steady," he said, so he "appreciated the time" that the administration gave him to learn the device. He primarily used the devices in order to facilitate projects that he asked his students to do, most of which he had used before the initiative, but the projects were now enhanced. "The iPads provide a great resource for research, locating news articles, reading up on the U.S. Constitution, et cetera." He noted that the iPads allowed for "unlimited access to research," which gave him the ability to "teach

and let students learn” instead of directing where students should go in order to find the appropriate research.

Mr. Burman spoke favorably of the initiative, but noted that there would be modifications going forward. “[Having the device] encourages students to type their write-ups (research reports) on them. This, for many, has led to more editing work later for students. Separating the research from the writing will be an important future effort going forward.” Even three years into the initiative, Mr. Burman was aware that using the devices was an evolutionary process.

The students. The middle school students at Odyssey School were what one would expect to see in a typical middle school. The students interacted with each other casually, conversed with each other in between classes, and would often stretch the limits of appropriate behavior. In one observation, for example, I noted that “these kids blurt more than my six-year-old daughter.” They reminded me of my own days teaching middle school when I observed them in between classes saying an inappropriate word then looking straight at me to see if I caught it, or poking fun at each other with the oddest of “your mama” jokes.

They certainly used the iPads, whether instructed to or not. I continually noticed that students used the devices at all points of instruction, randomly looking up information related to what the teacher was saying, if not completing a curricular task. As a whole, the students appeared comfortable with their iPads, used them often, and were prepared with fully charged batteries before every day

started. While I cannot be sure that their preparedness and level of use were always the case, it was consistent in the observations over the time of research.

Furthermore, as previously noted, the students behaved as though there was not an extra observer was in the room. While this was a pleasant surprise because it indicated the students did not consider me to have power over them or their teachers, it also led me to believe that what I was observing was indeed the students' normal behavior in the school environment. And in the middle school grades where hardly any behavior can be labeled as 'normal,' the indication that while I was there the behavior was normal for middle school students was welcomed.

Implementation of the One-to-One Tablet Initiative

The implementation of the tablet initiative began with the introduction and distribution of iPads to teachers before they left for summer break. The teachers were tasked by the administration with learning the devices over summer. A representative from Apple provided the teachers with professional development for several hours when they returned for the fall session. During the course of the first year, the teachers met weekly with the Assistant Principal and discussed what activities and strategies they were using the devices for in the classroom environment. Teachers were also encouraged to share app usage with each other by the assistant principal and technology teacher, whether in the context of the weekly meetings or informally during the day.

Since teachers were provided an iPad in advance of the initiative, they had time over the summer to be able to explore the device and potential uses. Whereas all teachers reported receiving their iPad as positive, some were unsure how to proceed at first. Julie Bennett and Kim Klein were in this situation. Julie Bennett thought, “How can I implement that with education?” whereas Kim Klein thought “How am I going to manage this?” There were two groups of teachers: those who already had experience with computer technology, including iPads, and those who had limited experience with this type of technology.

Teachers with previous tablet or technology experience. The teachers’ initial reaction to receiving the iPad had some level of correlation to any past experience with an iPad or similar tablet device. Jennifer Bennington, who said “my family had an iPad,” and Kim Klein, who “had lots of iPads in my previous school” each immediately felt some level of comfort with the device. Both of these teachers indicated that they were immediately ready for implementation in the classroom without needed extra time to learn the device. All they needed to know was how to transfer their knowledge of the device for enhancing the classroom experience. Ms. Bennington’s response to the initiative was, “Okay, how can I use this in my classroom?” Ms. Klein started looking at “all of the science apps...including downloading some to my phone.”

Julie Bennett had also used tablet technology in a previous teaching experience. Although she last taught in a high school setting, she was able to

take her prior experiences with tablet technology and transfer them to her teaching assignment at Odyssey. She had previously taught in a situation where students were allowed to bring their own iPads to the school, but were not issued a device by the school nor expected to use the device in any particular way. Ms. Bennett indicated, however, that a majority of the high school students brought an iPad to school, so she was able to use the devices with the students. She was “very excited that there are iPads [at Odyssey], as I had already thought about how to implement iPads in education. It has been on my mind for a long time.”

Teachers with limited tablet or technology experience. Some teachers indicated that they had limited knowledge of the uses of the iPad, but said that learning how to use the devices did not seem to be an issue. Even teachers who had no experience with any sort of tablet device did not indicate any trouble learning the device, but did appreciate that the school issued the iPads to the teachers first in order to learn how to use the devices on their own. Ms. Vonesh, who had been teaching at the school for many years, indicated that she “didn’t have a lot of experience beforehand” and was “a little nervous.” However, she “took the time to play around with it a bit” and eventually “just played with the apps and figured out which ones I could use with the students in the classroom.” In contrast, Ms. Acosta, who had no prior experience with either an iPad or similar touchscreen tablet or phone device, was also “very excited, and glad I

had the time to learn the device,” but she indicated that she had “no idea how to use it in the classroom.”

Both Ms. Vonesh and Ms. Acosta viewed the initiative favorably, but each also took time to learn the devices, sometimes invoking student assistance. The teachers seemed open and willing to learn from the students; three teachers indicated that they actually *relied* on the students to help learn the functions of the iPad device. Ms. Acosta stated that she was “able to ask the kids how to use the device, which sped up the process of using them in the classroom.”

Similarly, Mr. Burman indicated that he has “learned a lot of how to use the devices from the students.” This is a paradigm shift in education; students who would have traditionally relied on the teacher for information were now teaching instructors how to use learning tools in the classroom. For example, Ms. Vonesh “asked the students which apps are ones that they used if they had their own iPads, just so I could get started.” Additionally, Ms. Vonesh mentioned that she “would ask the students how to complete certain functions on the device, and they would be a big help with troubleshooting. They really liked and enjoyed helping me learn the device.”

There had been a limited number of iPads in the classroom in the year prior to implementation, although teachers were not expected to use them on a regular basis. Three teachers who had used the limited number of iPads in some capacity indicated that they looked favorably on the one-to-one tablet

implementation, but were looking for clarity and direction from the administration. Mr. Burman said he had been “excited that each student would have access to this technology, and hopeful that we will find a focus on how students are using them.” Similarly, Mr. Burns, who had used iPads the prior year, “was and was not excited; I wasn’t necessarily hesitant, but I was looking for direction of what exactly we were going to do with the devices.” Ms. Vonesh was likely the clearest of all: “I just kept waiting for (the administration) to tell me if I should use them for homework or for collaboration, or whatnot; so, I guess we get to use them however we want!”

Leader support. Odyssey teachers received minimal specific guidance about how to use the iPads in the classroom. Ms. Kane, who had been hired to implement the initiative, stated, “we gave them (the teachers) time to learn the devices with no real expectation of how to use them in the classroom. Well, I shouldn’t say no expectation; the expectation was that they would use them (the iPads) regularly with the students.” Whereas Ms. Kane and the administrators at Odyssey School might have provided ideas for specific ways that teachers should be using the devices, no such ideas or direction were forthcoming. Over time, the faculty met to discuss considerations of implementation from a policy and procedural perspective that included disciplinary procedures when misusing the device and if students were allowed to use them at special events such as field trips and assemblies. None of the teachers, however, mentioned during

interviews that clear expectations had been expressed about how students should be using the device in any specific ways in the classroom.

Ms. Kane said she was “excited to lead the initiative,” citing the fact that she had learned multiple platforms of technology over the more than twenty-five plus she had spent in education. Having served primarily as a technology teacher or coordinator, she felt that learning the device came second nature to her. Kane noted that “I have been learning new technologies all my life, at least while teaching, so this was just another one to learn to me, although I found it more exciting than in the past...maybe because of the size of the devices and the fact that you could poke at them with your fingers to make them work.”

Although the Assistant Principal, Ms. Palmer, was not yet at Odyssey School to oversee the initial implementation of the one-to-one iPad initiative, she was aware that a teacher’s comfort in knowing how to use the device is critical to using it in the classroom. Furthermore, she noted that she had heard that Odyssey teachers actively helped each other by sharing how they were using the devices in the classroom. Ms. Palmer felt that the teachers were exceptional at “taking risks and jumping right in...the ones who were already knowledgeable helped share that knowledge with others.” Ms. Palmer believed that it helped that teachers “were given the iPads first in order to get comfortable, then they were allowed to navigate on their own how they would use them in the

classroom. [Ms. Kane] showed them some ways to do so,” at least during the initial phase of implementation.

Conditions of implementation summary. Analysis of all of the interviews indicated that Odyssey faculty members appreciated that the Principal made the choice to implement the one-to-one iPad initiative. Perhaps this was because there were already iPads available on carts in the building, and the Principal chose to secure additional devices so that all teachers and students would have access to iPads a one-to-one environment. Although the initial implementation did not include any specific directives from either the Principal or Ms. Kane, the teachers said they appreciated that they were able to use the iPad devices prior to distribution of the iPads to all students. Each teacher was able to start with their own comfort level with the iPad, then used the device as they chose. Teachers who were comfortable immediately started to determine how to best use the tool in the classroom, and those who were not comfortable took time to become so. They learned from and shared with each other, including the students, in order to use the devices in the classroom.

Using the Devices – Perceived Effects, Benefits, and Concerns.

Many factors affected one-to-one tablet program at Odyssey School, including an effect on teaching strategies, student and teacher use of the devices, benefits of the iPad initiative, and considerations of the iPad initiative. In this section, I will describe each of these factors in detail.

Effect on teaching strategies. As the teachers began to use the iPad tablets in the classroom, many found their availability affected their teaching strategies. Just as with adopting a new textbook or instructional tool, some teachers adapted teaching strategies to fit the tool more easily than others.

Perceptions of positive effect. Five of the nine teachers indicated that universal access to the iPad tablets affected their teaching strategies. Mr. Burns, who had previously used iPads when there had been a limited number of the tablets in the building, stated that “it’s broadened my scope” in the “delivery of content” as well as enhancing the “format of lessons” by quickly being able to utilize videos or other media that had not been previously accessible to all students. However, Mr. Burns was quick to note that “it is the same content, just different mediums.” He noted that having the different mediums meant that he planned content delivery in a different way, which altered his teaching strategies in planning and preparation of lessons.

Realizing that students could quickly access information had an effect on other teachers’ strategies, as well. Ms. Bennett shared that she could “bring up any obscure concept in class, and the students can look it up immediately,” so she was no longer concerned about fully explaining materials or concepts because all could access the knowledge necessary to learn the class content. For example, she said that if she was teaching about the planets, she could just state “the planet Mars” and move on without explaining much about the planet if

Mars was not her primary focus. The students could readily search for information on Mars if they wished, or if they needed to know more background when completing work regarding the planets. This example showed that Ms. Bennett no longer believed that she needed to focus on every detail for every student. Instead, she expected students to access information on their own that they might need.

Ms. Bennett's description was an example of differentiated instruction in which every student learns content based on his or her own learning needs. As the content becomes differentiated for each student, every student may be more likely to learn content given that it is targeted at their individual level (Levy, 2008). Teachers do not make multiple lesson plans, but rather, adapt the lesson to the individuals' needs. Ms. Kane directly linked the iPads with the ability to differentiate instruction. She said that the iPad "gives students choices so that I can differentiate," citing an example where she asked the students to demonstrate content knowledge, but did not give them a specific assignment. Before the one-to-one iPad tablet availability, she might have assigned all students to either create a PowerPoint presentation or Word document (essay). Once all students had iPads, she allowed the students to create a slideshow, video, presentation, document, or an entirely original creation of their choice. She also chose to suggest particular avenues if she believed one medium to best

fit a student's needs over another medium. In this way, she could help guide the differentiation of learning goals for each student.

Some teachers indicated that the primary changes to their teaching strategies as a result of the widespread iPad availability were less about teaching and learning and more about changes in classroom logistics. For example, Ms. Acosta liked the fact that "now I don't have to spend time walking to the computer lab...(and)...I am now able to not wait to give students access to technology." Perhaps this improvement in time management perspective offered more of a convenience than a change in ways to foster learning.

Only one teacher reported that she made a change in the way she delivered course content. Ms. Kafer began to teach the math series completely online. She said, "The format of my lessons has changed, since everything is online, but the content hasn't changed itself." She elaborated that although it might seem to be convenient that the content is online, it was more of a frustration than anything. "Students spend more time scrolling, trying to find where they are at, finding passwords, all of those things." When I observed her classes, I also noticed that she spent some class time making sure all students were at the same screen, and other class time waiting for students to be in the correct app with the specific content brought up on the screen. Ms. Kafer indicated that some students had said that it was easier to have a physical textbook than an online one. For this reason, Ms. Kafer did not have a favorable

opinion of the online book, although she did not necessarily have an unfavorable one, either. Ms. Kafer appeared to be ambivalent about the online textbook experience.

Perceptions of little or no effect. In contrast, the remaining four teachers indicated that availability of the iPads had little or no effect on their teaching strategies. Ms. Vonesh reported that “it really hasn’t had...an effect...I just use it as a resource.” Despite sharing an example that indicated some differentiated instruction, Ms. Bennington said, “I haven’t seen a lot of impact” of availability of the iPads on her teaching. Ms. Vonesh and Ms. Bennett had vastly different prior experience with tablet technology; Ms. Vonesh had to learn the device from scratch and Ms. Bennett had experience in her personal life. Mr. Burman, who had previously embraced technology, indicated there had been no effect on his teaching strategies. Ms. Klein said of the availability of the one-to-one iPad implementation, “it really didn’t have an effect, but it made my teaching cool.” She felt as though her teaching was modernized because by incorporating the apps in to the classroom experience, she was better able to quickly and share the video files with students instead of projecting them to a bulky, larger screen.

Administrative perception. Ms. Palmer, the assistant principal, however, perceived that teachers were “moving beyond the textbook....(as there are) so many good resources that they’re finding.” She indicated that they did not “really

put a new textbook at the top of our list, which is a major change for the staff.” Perhaps the teaching staff did not realize that buying new textbooks was not a priority because none of the teachers talked about “moving beyond the textbook,” such that content delivery would be accomplished on the iPad.

Although teachers did bring up content delivery during interviews, I witnessed several examples of content delivery with the iPads during the observations. Teachers were using media such as videos or podcasts, assigning group projects, and did not assign formal papers. Teachers tended to assign presentations and collaborative activities rather than individual work and response. In this manner, they were replacing assignments to students with more collaborative content delivery. Teachers also often gave students choices when asking to complete formative assessments; they could choose between an essay, presentation, group quiz, video creation, or podcast. Perhaps teachers had altered content delivery more than they realized.

Conflicting responses in data collection points. There were a number of teachers who responded that there was no effect on teaching strategies, but as I noticed effects during my classroom observations. For example, Jennifer Bennington responded that there was “not really an effect on my teaching strategies,” yet she was using the devices to allow students to look up information in real-time, which affected the pacing of the lesson. Jim Burman also responded that there was no effect, and yet in his classes, I observed

students locating articles for class independently and without direction. Without the iPads, the articles would have been assigned to the students in a teacher-led fashion. With the iPads, Mr. Burman shifted the responsibility for finding the resources to the students.

Effect on teaching strategies summary. Although not all the Odyssey middle school teachers believed that the availability of iPads affected the way they taught their students, several did talk about using the devices in the classroom in order to give students options for the ways that students completed their assignments. Furthermore, my observations revealed that some teachers may have changed their approaches to teaching more than they said they had. Perhaps they had not noticed. Course content delivery was not provided on the iPads with the exception of math, although teachers did rely on the iPads as resources for students to gain information. Perhaps because teachers were not provided specific direction about how to use the iPads in the classroom to enhance teaching and learning, perhaps if all content delivery were on the iPads, or perhaps if students were expected to use specific apps for building-wide initiatives (such as a particular dictionary, a particular calculator, a particular set of interactive tools), teachers would have perceived that there were more effects from the availability of iPads on their teaching strategies.

Perceptions of student uses. Teachers, students, and the administrators all indicated they used the iPad tablets in similar ways. A majority of teachers

and students indicated that students mainly used the device for looking up information and as a research tool. As previously noted, some teachers said that the students had immediate access to information. Mrs. Bennett stated that “they use it for instant gratification if they don’t understand a word that I just said.” Another teacher indicated that students could immediately find an answer to questions that came up in discussion. Students quickly became adjusted to rapidly finding information during class, such as figuring out a definition to a word that they just read and didn’t know, or accessing tools, such as a calculator, quickly. Mr. Burns offered the succinct reflection that students can “get information...(snaps and winks)...right away.”

Both teachers and students indicated that they used the devices to capture and record information. Students indicated that they used the devices either for taking notes or taking pictures of notes on the whiteboard, although teachers had to adapt to this altered way of receiving notes. One of the teachers, who preferred to be unnamed for this particular quote, shared that “here I thought they were taking pictures of me, and I didn’t realize that they were just taking pictures of my notes, whereas the whole time I was standing there smiling thinking they were taking my picture.” Students took pictures of the notes unprompted. No one instructed them to do so. Ms. Kane shared that “students just started taking pictures of everything instead of somehow writing it down or finding another way to record it.”

According to the student surveys, the top three constructive uses were homework, looking up information and grades, and research or assignment completion. Ms. Palmer, the assistant principal, noted this popular use, as well. “I witness them for projects...word processing, submitting things...., (and) in math class using it for math calculations”. Furthermore, when students were asked which apps they most often used, the top three apps were Google Docs, Google Slides, and IXL (math content), which indicates that students were most often using apps to create documents, create presentations, or work on math content.

There was similarity in reported perception of use among teachers, students, and the administration. Each group of participants indicated somehow that the devices were used for coursework, content creation, and content delivery, although the responses varied slightly from teacher to teacher, and from student to student.

Benefits and concerns. Overall, administrators and teachers at Odyssey School perceived several benefits from the one-to-one tablet initiative, including students processing course content, student efficiency in finding material, and student preparation for technology integration in high school and beyond. I also found that several administrators and teachers had concerns about students’ use of iPads, perceiving the iPads as distracting students during class and using

them for purposes other than for school-related activities. In this section, I will describe the benefits and concerns in detail.

Processing course content efficiently. Teachers, students, and administrator alike noted multiple benefits of the one-to-one tablet initiative. Teachers found that they were able to get through more material or the same material, but in more depth. Ms. Kafer, the math teacher, noted that students were processing content “more quickly and efficiently...it has added depth to their understanding and it allows us to do new things; being more efficient allows us to do more activities related to it.” Ms. Kafer’s comment was especially interesting given that she was the only teacher at Odyssey to use an online textbook and had also commented negatively about the length of time it took to navigate the online textbook. Ms. Kane spoke of the efficiency in terms of students’ ability to produce content quickly, noting that using the iPads “might save them a little time, but it will save them a lot of frustration, because it used to be, ‘I know I want this and I don’t know how to get it there’.”

In their open-ended responses to the survey, several students also commented about increased learning efficiency as a result of using iPads. One wrote, “I access files during class work time. I find this extremely important, because I can ask questions and get my assignments done in class.” Two other students wrote, “I wouldn’t be able to write papers during study halls without it,” and “If I did not have an iPad it would be much harder to work on homework and

projects in class.” Despite Ms. Kafer’s stated concern about the length of time to find materials in the online math textbook, one student wrote about being able to “use my math book faster.” Students also identified efficiency on the survey as one of the benefits to having access to their iPad in class.

Mr. Burns used the iPads to assess students’ assigned work in ways that he had not previously used in his classrooms. Mr. Burns often had students take notes from lectures, which is a common practice among educators. He said he often used the iPad to “support a student who does not take notes well,” particularly by showing content in different ways. He helped these students by using tactics such as assigning different videos to different students, showing them online note-taking tools, or with other online resources.

Ms. Palmer also perceived easy and quick access to information as an efficiency benefit from all students’ access to their iPad tablets. She said, “If a student doesn’t know a word, Boom! They’re looking it up right then and there. It’s instantaneous.” Similarly, and Ms. Acosta said that “they [the students] get information quickly.” Ms. Kafer indicated that “students are processing content more efficiently and quickly.” Furthermore, during my observations in Odyssey School classrooms, I observed several students quickly finding information when encountering something that they did not know. In Ms. Klein’s seventh grade science class, bearing in mind that she indicated that she “rarely used the devices,” I saw a group of students working on a science experiment pick up their

iPads to find a particular formula and to look up a meaning of a phrase that they did not know. Similarly, in Mr. Burman's Social Studies class, several students accessed a map app during the lecture on the Middle East. One student looked at another, leaned over, and exclaimed, "I didn't know Egypt was in the Middle East; I thought it was in Africa!" Clearly, this student had used the tablet device to look up information and find an answer quicker than he might have if he did not have the tablet as the resource.

In addition to the benefit of students' finding information online quickly with the iPads, Ms. Palmer also perceived that students were learning at a quicker level than they had before the iPads were available to all students in Odyssey School classes. She compared students' depth of understanding to their ability to produce quality work. She noted that "the deepest impact [of the iPad one-to-one initiative] has come in... product:... how are they able to produce their work and...change their work and the quality of their work." What Ms. Palmer spoke of is the ability to assess student work for depth of understanding. "Students learn better when they are able to work on a presentation and have their video clips, pictures, notes, and resources all in one place. They can 'get it' much quicker than if they were having to move between different sources, and we can see and assess that they 'get it' much quicker."

Ms. Palmer noted that having access to the internet via their iPads helped students figure out for themselves how they learn. She observed that when

students used their iPads as tools, it “helps kids to figure out a way for themselves how they learn and...to use it as a support tool.” As noted in an earlier section, Ms. Vonesh applied the practice of differentiated learning by “letting students work at their own pace.” Not every student needs to be at the exact same place in the lesson, given that each student learns slightly differently. And although Ms. Vonesh may not have been explicit to students in basing the self-pacing on learning style, she noted that the two are related by allowing the students to learn in their own way at their own pace.

Teachers also indicated that the iPads were somewhat of a convenience factor in the classroom. Ms. Bennington, the younger science teacher, indicated that widespread availability of the tablets “makes my life as a teacher a little easier, too, that they can just access literally anything in...their hands” and “it gives me different ways to support a student.” She indicated that her planning time was also decreased, as she would not prepare as many physical resources in advance of the lesson, such as making photocopies or distributing reading materials.

Preparation for the future. Another benefit of the one-to-one iPad tablet initiative, according to some Odyssey teachers was preparing students for using computers to assist with their learning in the future. Mr. Burns indicated that “(the students) have more aptitude” and do “not have as many trepidations” [as the teachers]. Mr. Burns argued that as students gained experience with using

the iPads at Odyssey, the students would benefit by being able to know how to use similar devices in high school, whether or not the devices would be iPads. Even Ms. Vonesh, who had no prior experience with technology, noted that “it’s good to get them ready for the real world and this is the kind of stuff they’re probably going to need to know for future jobs.”

Cause of distraction. Every Odyssey teacher I interviewed mentioned that the iPads posed a distraction in the classroom. Ms. Bennett noted that “it can be a real distraction for the kids,” and Ms. Bennington gave a prime example:

“Sometimes the students are easily deterred away from the assignment that we’re doing, like they’re, they have their iPad in front of them and they go, ‘Oh, I can just click this button and I’m on the Internet; I’m on YouTube.’”

During my observations, I could see students doing multiple keystrokes on their tablets without making a sound, so it might have been difficult for teachers to ensure that students were focused on the current lesson unless students were somehow locked down to a particular screen. No teachers at Odyssey mentioned the practice of locking down the iPads, so I assume that students were able to bounce back and forth among apps and the open internet as well.

Mr. Burns noted that the distractions went beyond students actually having continual access to the iPad tablets. He said, “there are kids who are just

obsessed with that device and they have to have it. Even if it's off and it's, and the screen is down and it's somewhere over here, it's still a distraction to them. It can't even be within their sight."

Some teachers saw the distraction as a trade-off, or at least, part of life. After noting that students were often distracted, however, Mr. Burns said that the students' distraction "is just like our own (adult) cellphones are...we're addicted to those, and I think it gives them different ways to get information." Thus, Mr. Burns realized that adults are also susceptible to distractions while using tablet-style phones, and could see that the distraction was offset with the benefit of efficient access to information. Ms. Kane looked at the distraction from availability of the tablets in comparison to what distracted students before the iPad initiative was launched. She said, "They're not necessarily more distracted than they were before or less distracted than they were before, it's just...different." Moreover, she indicated that "instead of daydreaming they're tangibly playing, something we can see."

Ms. Palmer, the Assistant Principal, did not see the devices as distracting, noting that "the students are able to make choices instantly, which looks as though they are all doing something independently," and there are "lots of different... ways...of functioning in the classroom." Ms. Palmer perceived that the iPads provided an opportunity for students to work independently and

autonomously in the classroom, instead of all students completing the same task at the same time.

Ms. Kane acknowledged that she initially perceived some of the students' use of the iPad tablets as a distraction, but later learned that it wasn't so. She said, "you think that they're up to something because their iPads are always out, and sometimes I have to catch myself and actually look to see what they're working on before I ask them to put it away, because a lot of the time it's valid work."

Use of the tablets for other than school-related activities. There were of course, times where students were not completing school work while using the iPads. One restriction that Odyssey school put on the students from the beginning of the initiative was that students were not allowed to play games. However, in their responses to the survey, eighteen of the students indicated a use of the iPad during class as "playing games." Additionally, five of those students listed game-only apps as their mostly used apps, with two students indicating that they only used their iPads to play games. Although playing games did not appear to be in the majority of student use, it appeared that at least nineteen percent of the students were distracted by playing games rather than paying attention to what they were supposed to be learning during class.

Additional concerns. A few teachers expressed other concerns about the impact of students' continual access of iPads, as well. Ms. Kane mentioned

that a “negative impact is that their ability to memorize things has [been] decreased tremendously.” She said that “they are so used to being able to look things up that they don’t rely on their memory as a tool.” Sam Kafer was concerned about the devices potentially overwhelming the students, saying that “they’re lost in the choices and other kids see all of these tools as, ‘okay, I know where to go and find the information I need.’” Whereas some students were able to quickly access information, others were lost in the ability to choose between different apps to complete tasks.

Two teachers also mentioned the lack of full-size keyboard as a concern, but both dismissed the concern as minor in relation to potential solutions. Mr. Burns, who taught English, said that “I have to get creative when I assign essays, as it is really difficult to type on the keyboards....I guess we are losing typing skills...but then again, some of the kids prefer to dictate anyways, which they couldn’t have done with computers.” Ms. Kane, the technology teacher, noted that “I don’t teach typing anymore, because it isn’t really applicable. At first I was mad about that, but then I realized that I just needed to let it go and realize that maybe typing isn’t as important anymore....I mean, watch these kids text these days...that’s not typing at all.” So although the lack of a full-size keyboard was initially a concern, these teachers found alternate ways to accomplish the objectives without the keyboards. In both cases, however, these teachers came

to the conclusion that perhaps a full-size keyboard wasn't a necessity, but rather a tool that they were used to using.

Benefits and concerns summary. Teachers and administrators noted several benefits and concerns in regards to the one-to-one tablet initiative. The notable benefits included the ability to process course content more efficiently, as well as being prepared for future schooling by using the technology. The largest concern among teachers was that the iPad was a potential cause of distraction, with another major concern that the iPads were being used for non-school activities while students were at school. Lastly, there were outlier concerns such as a decreased ability to memorize, students lost in the choices to make, and lack of a full-size keyboard.

Conditions Under Which Teachers Implement a New Technology Initiative

Analysis of the teacher interviews revealed several conditions that affected how individual teachers at Odyssey School implemented the one-to-one tablet initiative, including professional development, prior experience with technology, years of teaching experience, and generational cohort.

Professional development. As described in the opening section of this chapter, there was little professional development about how to teach with iPads provided to the teachers prior to implementation. The teachers were essentially handed the devices at the end of a school year in order to learn how to use the

tablets by themselves over the summer months. Apple, Inc. provided a four-hour workshop to the teachers and administrators prior to the program implementation to outline basic uses of the device (such as powering the device, charging, settings, and storage), possible applications to use in the classroom, and provided time to address teachers' questions. Six of the nine teachers indicated that they discussed using the devices in formal staff meetings and in casual conversations during the school day, but these discussions were not planned and strategic. Strategic and goal-based professional development of the teachers is critical in any initiative, as teacher training is directly correlated to student learning (Bransford et al., 1999; DeMonte, 2013; DuFour & Marzano, 2015).

Odyssey teachers did not indicate that professional development was required or that they had requested it. During interviews, the teachers did not say they yearned for extensive training, nor did they indicate that they might still have much to learn about how to use the tablet technology to foster student learning. It may be that they did not know enough to ask how to learn more.

Prior technology experience. Cross case analysis of all the interviews revealed little about teachers' prior technology experience and the ways teachers encouraged students' use of the iPads in the classroom. For example, Jennifer Bennington said she grew up using an iPad, and implemented the initiative robustly in her classroom. SuAnne Kane had been at the forefront of implementing computer technology for a number of years both in school and in

personal life, and her students were using the devices often in class. In contrast, Kim Klein had also used an iPad extensively for a number of years for personal purposes, but hardly used the iPads in the classroom. Julie Bennett had experience with her own iPad, but only used the devices in the classroom to give students the ability to watch videos.

Teachers who had little prior experience with tablet technology also implemented use of the devices in widely varying ways in their classrooms. Robert Burns and Jim Burman reported little prior experience, but yet both used the iPads with their students.

The remaining teachers were somewhere in the middle. Jeri Vonesh used an iPhone (not an iPad) for two years prior to the iPad initiative at Odyssey, but did not see how it affected her teaching strategies nor did she encourage her students' use of the devices. Sam Kafer had past instructional experience with technology (not iPads) at a different school, and yet only used the iPads to access the online math textbooks. Finally, Sylvia Acosta had no iPad experience and did not use the iPads with her students except to allow her students to look up information.

As a result, in this case study there is no correlation between prior experience and self-described level of implementation. Thus, the range of ways in which the teachers at Odyssey School used iPads for instruction and encouraged their students to use them to enhance learning did not seem to be

associated with the teachers' prior experiences with computer or tablet technology.

Years of teaching experience. Cross case analysis of the interviews and observations of Odyssey teachers revealed there may have been little association between the teachers' years of teaching experience and the ways they used widespread availability of iPads for teaching and learning with their middle school students. I grouped the Odyssey teachers in to the following categories, based upon the total number of years teaching experience: less than ten years of experience between ten and twenty of experience, and more than twenty years of experience. The findings are as follows:

The teachers with fewer than ten years of experience included Sylvia Acosta, Kim Klein, Julie Bennett, and Jennifer Bennington. Sylvia Acosta said her students only use iPads for looking up information. Julie Bennett's students used the iPads for watching videos and quickly accessing information. Kim Klein hardly used the devices with her students, other than to allow them to access information as a resource. Jennifer Bennington used the devices with her students for student presentations, collaboration, accessing information, working in pairs to quiz each other, online quizzes, and access to videos to explain concepts. Thus, one of the four Odyssey middle school teachers with fewer than ten years teaching experience used iPads extensively when teaching her classes and three did not use them much at all.

Teachers who had between ten and twenty years of experience were Jim Burman, Sam Kafer, and Jeri Vonesh. Jim Burman used iPads to foster student-centered learning. "Students are responsible for generating sources of information via search engines, as opposed to teacher-led direction." Sam Kafer's teaching remained teacher-centered, but she and her students accessed the math textbooks through the iPads. She was observed using a lecture-and-question format in which she lectured students on material, allowed for student questions, and then directed the students to complete their homework in the textbook located on the iPad. Jeri Vonesh primarily used iPads either as a reference or to allow students to work on presentations, although she did not necessarily direct students to use the iPads but gave them the choice.

Jim Burman had seemingly embraced the devices as able to be student-centered, whereas Sam Kafer still utilized the teacher-directed learning strategy, which is a different use of the device. Sam Kafer used the devices to access the math curriculum, but was not observed using them for project-based learning or student-centered learning, as in the case of Jim Burman. Jeri Vonesh allowed students to use the iPads, but did not heavily use the iPads herself. All three Odyssey middle school teachers with ten to twenty years of teaching experience used the iPads in their teaching, but in very different ways.

Odyssey teachers with more than twenty years of teaching experience were Robert Burns and SuAnne Kane. Robert Burns used the devices with his

students for choice in how to complete assignments, collaboration between students when working alone or in groups, and peer review of assignments; furthermore, he encouraged students to use the iPads to access information and instructional tools. SuAnne Kane, the technology teacher, used the devices in order to differentiate to students and give them options in order to accomplish course objectives. They would be given several different ways to complete the technology tasks, and the tasks could be done in any particular order. Also, she encouraged the students to look up information that they did not know, check grades to be sure that they had turned in assignments and received feedback, and fostered student collaboration and communication with the devices. Both of these teachers used the iPads a lot and in creative ways with their students.

Regardless, there does not appear to be a strong association, if any, between years of teaching experience and implementation. Although the very experienced teachers similarly implemented the technology, there were only two in this category, one of whom was the technology teacher and coordinator. Given that there was the possibility of this factor influencing the data and that the other two categories were highly inconclusive, it would be acceptable to presume that years of teaching experience did not affect implementation at Odyssey School.

Conditions summary. The conditions under which the teachers at Odyssey School implemented a new technology initiative did not seem to be related to prior technology experience or to prior teaching experience. Those with more years of experience teaching have had sufficient skill to find it easier to figure out some ways to add new ways to teach to their skill base than teachers with less years of experience teaching.

In the absence of professional development, the teachers did not indicate that there was a 'next step' in professional learning that would have enhanced the use and effect on teaching strategies, or that the 'next step' was necessary for professional growth. The irony here is that these individuals were teachers! Not one teacher indicated that there was expected growth in their own knowledge and experience in using tablets to be attained in moving forward within the program implementation. As indicated earlier, teachers were just asked to take home the devices and become familiar with them over the summer months prior to implementation.

Perceived Effect on Student Learning

In this section, I will discuss the perceived effect on student learning from the perspectives of students, teachers, and administrators. I will discuss the students' perceptions from the student survey, teachers' and administrators' perceptions from the interviews. Lastly, I will provide a compilation of mentions of perceived effects on student learning activities across all three data sources of

interviews, observations, and student surveys to compare and analyze through the SAMR model.

Students. Two of the student survey questions were designed to elicit responses from students on how they perceived that using the tablet devices impacted their learning (see APPENDIX E). These questions were “How well does your iPad help you learn in class?” and “How well does using your iPad help you participate in class?”

According to the students, when asked on a scale of 1-5 (with 1 being the lowest perceived effect) if the iPad help the student learn in class, the mean response was 3.43, a slightly positive response. Similarly, when asked on the same scale if the iPad helped the student to participate in class, the mean response was 3.24, another slightly positive response. Therefore, students as a whole in this sample did not indicate a positive or negative perceived impact on learning. The results are also shown in the table below:

Table 2: Student perceptions of effect on learning:

<i>Question</i>	<i>Response</i>
How well does your iPad help you learn in class?	n=3.43
How well does using your iPad help you participate in class?	n=3.24
(Scale = 1-5)	

When I analyzed students' responses by grade level, however, a pattern emerged, especially when students addressed the question of whether using an iPad helped them learn in class. The mean response of students in Grade 6 was a positive 4.06 to this question. In contrast, the mean response of students in Grade 7 was a neutral 3.10 and the mean response of Grade 8 students was a slightly negative 2.92.

There also appeared to be grade level effect when students addressed the question of their perceptions of how well the iPad helped them participate in class. The mean response of students in Grade 6 was a slightly positive 3.45 to this question, the mean response of students in Grade 7 was a neutral 3.16 and the mean response of Grade 8 students was a slightly negative 2.92.

Table 3: Student perceptions of effect on learning by grade level:

<i>Question</i>	<i>Grade 6: (39 responses)</i>	<i>Grade 7: (20 responses)</i>	<i>Grade 8: (26 responses)</i>
How well does your iPad help you learn in class?	n=4.03	n=3.10	n=2.92
How well does using your iPad help you participate in class?	n=3.45	n=3.16	n=2.92
<i>(Scale = 1-5)</i>			

The mean response to both questions decreased as the grade level increased. The higher the grade level at Odyssey School, the less students reported that using the iPad helped them learn in class. When surveyed, the sixth graders were in their first year of implementation, as sixth grade is the first year in which Odyssey students received an iPad. Most students in seventh grade (those who were not new to the school) were using an iPad for the second year, and students in eighth grade were in their third year of iPad use. Either the Odyssey students perceived more influence on their learning when they first were able to use iPad tablets in the classroom than later, or students became more used to using the tablet devices and did not see as large of an impact. Also, the effect is not teacher-driven, as students learned with many of the same teachers across grade levels (See Table 1: Personnel).

Teachers and administrators. Teachers varied in their response to the question about whether they perceived that the use of iPad tablets in the

classroom affected on student learning. Several teachers said they did not perceive much impact on student learning. For example, Ms. Vonesh said that “I don’t think there is any,” and Ms. Klein responded “I don’t think so...[pause]...but I don’t think I use them enough to really know.” Ms. Acosta noted that “although students are getting the information quicker, I don’t think it is affecting their learning.”

Other teachers responded that they were not sure if they perceived an impact on student learning from the use of iPad tablets by students and themselves in Odyssey classes. Mr. Burns stated “it’s hard to give a broad scope; it really comes down to the individual student and how in-depth they are using the iPads.” Ms. Bennett responded, “although I see a resource they can use, I am not sure if it is affecting all of their learning, although I am sure it helps some students.” Ms. Bennington put the onus for learning on the students themselves when she said, “I think it can enhance their learning if used appropriately; what’s important is for students to learn how to use this technology to enhance their learning.”

Similar to Ms. Bennington, Mr. Burns indicated that “it’s hard to give a broad scope; I think that’s such an individual thing depending on how well and how meaningfully each student uses some of the tools.” Ms. Bennett didn’t know if the iPad had an effect, but offered instead the benefit of using the device for the aforementioned purpose of having an efficient resource at hand. “I do see

that they do have a resource in their hands if they need to look up how to spell something or, you know, um, “Is this correct, or is that correct?” It appeared as though the teachers, as a whole, did not see any perceived effect on student learning.

On the other hand, Ms. Palmer, in her role as an administrator, did see the devices as having an effect on student learning. She stated, “I do think it’s had a profound impact on student learning in the sense that it helps our kids to stay organized, it is how they turn in their homework...it is how they function...in the classroom.” She later indicated that the impact is “on the process of learning rather than a data-like effect showing understanding”.

Perhaps the differing perceptions of whether one-to-one iPad use affected student learning at Odyssey School may be because ‘student learning’ was not defined by members of the school community. Maybe Ms. Palmer, who responded that there is a perceived effect on student learning, had one assumption about what student learning meant and many of the teachers and students assumed something different. Or, maybe Ms. Palmer saw the future of the initiative and was projecting results. Perhaps there was an effect on student learning from Ms. Palmer’s point of view and yet the teachers did not know what to look for. Thus, there may be a number of explanations for this variation in perceptions about the effect of the use of iPads on student learning.

SAMR. As discussed in the review of related literature, the SAMR model can allow evaluation of ways technology is used (Puentedura, n.d.). The categories to which technology-related activities are as follows:

S: Substitution – *Technology acts as a direct tool substitute, with no functional change*

A: Augmentation – *Technology acts as a direct tool substitute, with functional improvement*

M: Modification – *Technology allows for significant task redesign*

R: Redefinition – *Technology allows for the creation of new tasks, previously inconceivable*

Puentedura (2006) categorizes the four descriptors into two categories; enhancement and transformative. The technology can either enhance the task design, or it can transform the task the design. Transformation is more significant than enhancement. Puentedura (2006) describes ‘Substitution’ and ‘Augmentation’ as enhancement; the technology enhances the learning activities and objectives. ‘Modification’ and ‘Redefinition’ are described as transformative; the technology allows for a transformational change in the way that the learning activities are designed and executed.

I will first report separately the analysis of observed student uses, teacher-reported student uses, and student-reported uses. I will then present a table that

shows all responses combined. As I indicated in Chapter Three, some activities were easy to code into categories, and others were quite difficult. As I coded activities into categories, I used the above definitions, while focusing on the final words of each definition. I first coded the activities in to either 'S/A' or 'M/R', noting that either the technology acted as a direct tool substitute or task redesign. Once categorized in to two parent codes, I separated the "S" from the "A" by focusing on either "no functional change" or "functional change", respectively; and 'M' from 'R' focusing on either "significant task redesign" or "creation of new tasks...previously inconceivable", respectively.

For example, I categorized 'typing notes during lecture' as "Substitution" in that I believed that students could use any device to type notes; in fact, they could simply hand-write the notes on paper. The iPad was only acting as a substitutive tool. However, I categorized 'e-mail my teacher' as "Augmentation" because although a student could instead talk to their teacher, there is functional improvement in that an e-mail communication can be a stronger choice for a student who prefers the written form over speech, or the email may allow communicating with a teacher that they may not be with at the moment.

I will describe some more difficult examples for the remaining categories. I categorized 'checking my grades' as "Modification," as I felt that students would not be able to check grades in real-time without the initiative. If students had access to the computer lab, they could check grades periodically as they were

able to access the computers. But having an iPad with them at all time, allowed the task of checking grades to be significantly redesigned and could potentially impact how they might complete their coursework, and in what order (such as doing missing work first). Lastly, I chose to categorize ‘working on quizzes’ as “Redefinition”, as students were creating quizzes and responding to quiz questions instantly with the results of question responses indicated on each tablet device (so that students could gauge how other students were responding). The teacher would then use these instant responses as formative assessment in order to move forward. Without the tablets, students would have little knowledge of how other students were responding instantly, and thus the activity was previously inconceivable.

As part of the data collection process, the ways in which students used their iPads was observed and recorded. Most of the activities fell in to the ‘Substitution’ category, with some falling in to “Augmentation and “Modification,” and only one activity in the “Redefinition” category. The summary of observed uses are shown in the following table (duplicate or very similar responses are omitted):

Table 4: Observed student uses categorized by SAMR:

SAMR Level:	Observed student uses
S: Substitution	<ul style="list-style-type: none"> • Work in groups on presentations • Typing notes during lecture • Homework completion • Record data (science experiments) • Look up news articles • Using device to present
A: Augmentation	<ul style="list-style-type: none"> • Work in online pairs to quiz each other • Organization (calendar, etc.)
M: Modification	<ul style="list-style-type: none"> • Look up information instantly • Check grades • Accessing videos individually
R: Redefinition	<ul style="list-style-type: none"> • Working jointly on quizzes and presentations in real-time; responses are real-time and indicated on all participants' screens

Teachers also reported a number of uses of iPads in their classes when I interviewed them. The summary of reported uses are as follows (duplicate or very similar responses are omitted):

Table 5: Teacher-reported student uses categorized by SAMR:

SAMR Level:	Teacher-reported student uses
S: Substitution	<ul style="list-style-type: none"> • Looking up Information • Work on presentations • Watching videos • Writing essays • Taking notes • Locating news articles • Group collaboration • Math textbook / resources online • Look up definitions of words
A: Augmentation	<ul style="list-style-type: none"> • Providing individual student presentation materials for other students to access as presenter is presenting
M: Modification	<ul style="list-style-type: none"> • Create videos • Immediate access to grades
R: Redefinition	(none reported)

Student use and activity responses on the student survey were also analyzed by SAMR level. The summary of responses are as follows (duplicate or very similar responses are omitted):

Table 6: Student-reported uses categorized by SAMR:

SAMR Level:	Student-reported uses
S: Substitution	<ul style="list-style-type: none"> • Surf the web • Google Docs • Complete homework • Type papers • Calculator • Study for quizzes or tests • Talk to friends at night • Make presentations • Research
A: Augmentation	<ul style="list-style-type: none"> • Email my teachers
M: Modification	<ul style="list-style-type: none"> • Access information quickly • Look up words I don't know instantly • Look up videos of things I don't know instantly • Take pictures of my assignments • Access math book which makes backpack lighter
R: Redefinition	<ul style="list-style-type: none"> • Getting notifications of things I need to do (as I need to do them; calendar is associated with task list)

When combined, the total reported uses during this study are as follows:

Table 7: Total reported uses categorized by SAMR:

SAMR Level:	Reported and observed uses
S: Substitution	<ul style="list-style-type: none"> • Looking up Information • Work on presentations • Watching videos • Taking notes • Group collaboration • Math textbook / resources online • Look up definitions of words • Work in groups on presentations • Typing notes during lecture • Homework completion • Record data (science experiments) • Look up news articles

	<ul style="list-style-type: none"> • Using device to present • Research • Reference • Locating news articles • Look up definitions of words • Surf the web • Google Docs • Type papers • Calculator • Study for quizzes or tests • Talk to friends at night
A: Augmentation	<ul style="list-style-type: none"> • Work in online pairs to quiz each other • Organization (calendar, etc.) • Email my teachers • Providing individual student presentation materials for other students to access as presenter is presenting
M: Modification	<ul style="list-style-type: none"> • Look up information instantly • Check grades • Accessing videos individually • Create videos • Immediate access to information • Check grades • Access math book which makes backpack lighter • Email my teachers • Take pictures of my assignments
R: Redefinition	<ul style="list-style-type: none"> • Working jointly on quizzes and presentations in real-time; responses are real-time and indicated on all participants' screens • Getting notifications of things I need to do (as I need to do them; calendar is associated with task list)

The categorized data reveal some interesting issues. First, teachers did not list any uses that were in the “Redefinition” category, and yet students did. Either teachers were unaware of these uses, or they simply did not report them when asked. Secondly, the strikingly low amount of uses in the “Redefinition” category would suggest that the students are rarely using the iPads in a way that was “previously inconceivable” (Puentedura, 2006).

The majority of activities in the ‘Substitution’ and ‘Augmentation’ categories has some connections to findings presented previously. Either the teachers were

unaware that there were next steps in utilizing the technology, or they had not been presented with the opportunity to learn other uses. Again, professional development was markedly absent from the onset of the initiative, which might have limited the effectiveness of the overall program. If meaningful professional development was obtained and continued program evaluation utilized, perhaps Odyssey School teachers and students would engage in more activities that could be listed in the 'Redefinition' category.

Conclusion. Given that the administration had not provided teachers guidance on how the iPad tablet devices were to be used in the classroom, there may have been little perceived effect on learning because teachers did not know how to conceptualize ways to use the devices to affect learning or know how to recognize real changes. Had learning goals been defined and examples of learning effects been articulated prior to the initiative, results might have been different. Odyssey teachers might have been missing opportunities to create new types of learning experiences with technology because the teachers were simply using the new technology the same way they had been using the old technology (Peuntedura, n.d.). For example, if Odyssey School had provided professional development regarding uses of tablet technology that could markedly modify or redefine student learning, the impact of the initiative and the findings of this case study might have been different. Of course, there may be a number of explanations for why the students and teachers did not report a

strong effect of the use of iPads in the classroom on student learning, notably the lack of professional development, focus of the program, student familiarity with the devices over their own implementation period, and the absence of desire for teacher professional growth.

Summary

This chapter reported the findings of this case study. The site and students of Odyssey School were described, as were the backgrounds and previous experiences of the teachers and administrators.

Prior to implementation, teachers were allowed to use the tablets in order to learn the devices and plan for implementation. Regardless of previous experience, teachers found that the devices were easy to learn.

During the 2013-2014 school year, the one-to-one tablet initiative was implemented. As a result, five of the nine teachers reported that integrating the iPads had an effect on their teaching strategies, whereas four did not. The administrative perception of the effect on teaching strategies was also explained, as was the variance between the data gained in interviews compared to the data gained from classroom observations about perceived effect of iPad availability on teaching strategies.

In addition, this study found that the iPads were being used by teachers and students in different ways. Teachers, administrators, and students all

reported uses of the iPads at Odyssey School. Whereas some of these uses resulted in perceived benefits, others resulted in areas of concern.

This study found that there was a weak association between the teachers' prior teaching experience and depth of use in the classroom, but that there was no association between teachers' prior technology experience and the uses in the classroom.

Lastly, the perceived effect on student learning was described as reported by teachers, administrators, and students. Whereas students as a whole did not report a positive or negative perceived effect on learning, students broken down by grade reported a decreased effect on learning as the grade level increased. Teachers did not perceive much impact on student learning, although the administration did. Potential reasons for the difference in perception between the teachers and administration were explored.

Finally, the reported uses were analyzed through the SAMR model, with the results indicating that very few of the activities could be considered transformative (Puentedura, 2006). Potential implications for practice and research as a result of these findings will be discussed in the next chapter.

Chapter Five: Discussion

Introduction

This final chapter provides a summary of the research and major conclusions, which were drawn from the research and related to the conceptual framework and worldview adopted in this study. This chapter also draws together the research questions and findings in order to present key lessons learned from the analysis of the data. Implications for future practice will be discussed, which will be useful to stakeholders in independent and charter schools that are either considering adopting a one-to-one tablet initiative or who are in the beginning phases of implementing such an initiative. Finally, implications for future research will be discussed, which recognize the contribution of this study to research about implementation of technology initiatives and suggests show the results of this study may inform future research.

Summary

This qualitative single case study explored the ways that teachers in a single private middle school integrated one-to-one tablet use in to their classroom practice. The case study also explored how and in what ways the students and teachers perceived that school-provided one-to-one student access to tablets affected student learning. The review of relevant literature included the use of technology in instruction, external factors affecting teachers, and the perception

of the effect of technology on student learning. Over the last thirty years, there has been an increase of computer and tablet use in the classroom (Harold, 2016; Reidel, 2014; Smerdon, Cronen, Lanahan, Anderson, Iannott, & Angeles, 2000; U.S. Department of Education, 2010). As schools implement new technologies, they are often faced with yet another technology reform effort, as technology changes quickly (Barack, 2010). Students also now use technology and are often more knowledgeable about tablet devices than teachers and administrators. However, students often show teachers how to use the tablet devices, which highlights how what could be perceived as a challenge is also a benefit (Bradley, Goodman-Deane, Waller, Tenneti, Langdon, & Clarkson, 2013; O'Brien, Rogers, & Fisk, 2012).

One important contribution of this study is its setting in a private school. Over the last fifteen years, enrollments have increased in private and independent schools (U.S. Department of Education, 2010). Independent and private schools face both opportunities and challenges because they are not supported within a public school district. Administrators and teachers in private and independent schools may have more freedom than those working in public school districts; however, there are also fewer resources available (Davies & Davies, 2014). Private and independent schools must determine the best ways to use resources, which requiring administrators to be well-informed when investing their limited resources in equipment and programs. This case study,

which explored the implementation of a one-to-one tablet initiative in a private school, includes benefits and limitations that stakeholders in other private schools can use to inform decision-making about similar initiatives. The preponderance of prior research about implementing one-to-one technology initiatives has been conducted in one or more public school districts (Dogan & Almus, 2014; Donovan et al., 2010; Eid & Al-Zuhair, 2015; Ferguson, 2016; Karsenti & Fievez, 2013; Kontkanen et al., 2016; Murray & Olcese, 2011; Singer, 2015; Smith & Santori, 2015; Thornthwaite, 2015; Walters & Baum, 2011). Therefore, this study addresses a gap current knowledge about technology.

The case study focused on the following research questions:

1. Under what conditions and in what ways do teachers in a private school integrate one-to-one tablet use into their classroom practice?
2. How and in what ways do students and teachers perceive that school-provided access to students' own tablets affects student learning?

Chapter One provided the background information for this study, as well as an overview of the SAMR model that was used in the analysis. The SAMR model is a tool which school stakeholders can use to evaluate technology initiatives designed to foster student learning. Technology-related teaching and learning activities are categorized in to one of four hierarchical categories, represent the depth at which the technology is being used. The SAMR model is

used in the field of education to evaluate programs involving technology implementation (Hamilton et al., 2016; Hilton, 2016; Hockly, 2012; Jacobs-Israel & Moorefield-Lang, 2013; Puentedura, n.d.; Puentedura, 2006; Romrell et al., 2014).

Chapter Two highlighted relevant literature, as well as discussed the conceptual framework and worldview adopted for this study. The conceptual framework depicts factors that might affect use of technology for instruction in the K-12 setting including factors that may affect the teachers, the SAMR model, and the perception of the effect on student learning.

This study is guided by the worldview of critical realism (Bhaskar, 1998; Maxwell, 2012). A critical realist point of view is one in which reality exists independent of our perceptions, while at the same time our understanding of the reality is our own construction (Maxwell, 2012). By adopting the worldview of critical realism, I was able to recognize that the perceptions of the stakeholders were constructed from beliefs and perceptions and is not necessarily truth, while at the same understanding that the phenomenon of the tablet program implementation existed independently of the constructed reality.

Chapter Three described the qualitative data collection and analysis methods used in this single case study, as well as site selection and participant recruiting efforts. I chose to triangulate data by using three qualitative research approaches: participant interviews, external observations, and student surveys.

As this study is guided by critical realism, the administrators', teachers', and students' perceptions are real, as are my observations. Odyssey School, the private school which was site for the case study, had two class sections each of grades six, seven, and eight. All students in these six classes had been individually assigned an iPad as part of instruction for the previous two and current school year at the time I collected data. I interviewed all nine teachers and two administrators that participated in the one-to-one iPad tablet initiative. Interview questions elicited participants' perceptions about the implementation of the initiative, effect of use of iPads on teaching strategies, the uses, benefits, and concerns about the tablets, and any effects on student learning.

I observed each class of students twice as they rotated between teachers who taught different subject areas. This allowed me to see how different teachers used the tablets with the same group of students, and it also allowed me to see how the same teachers used the tablets with different groups of students. I used the observation data to compare and contrast between the data that was gathered in the interviews.

I surveyed students to examine their perceptions of the effects of the use of the iPad tablets on their own learning. During their technology class, students completed an anonymous, online survey. Results were sent directly to me electronically. Each completed survey was marked by grade level and class section, so I was able to analyze the survey data by grade level.

The transcriptions of the interviews, observation notes, and student responses to open-ended questions on the survey were coded by hand. Data was categorized and analyzed by drawing out patterns in the data in order to develop themes and responses to the data.

The single case study of implementation of a one-to-one tablet initiative at Odyssey School is not generalizable to any population of schools, administrators, teachers, or students. Instead the rich description from the analysis of the case is designed to provide sufficient information to allow practitioners in independent schools or other researchers to make good decisions about their own contexts. This study was conducted at a specific point in time, and some of the data is retrospective.

Chapter Four reported the findings of this case study. The site and students of Odyssey School was described, as were the backgrounds and previous experiences of the teachers and administrators. The teachers and administrators at Odyssey School represent a wide range of experiences and ages.

Prior to implementation, teachers were allowed to use the tablets in order to learn the devices and plan for implementation. Regardless of previous experience, teachers found that the devices were easy to learn.

As a result of the one-to-one tablet initiative, five of the nine teachers reported that integrating the iPads had an effect on their teaching strategies,

whereas four did not. However, there was a variance on the reported effect on teaching strategies and those that were observed. The variances will be explored in light of an implication for future practice to be described later in this chapter. The administration reported that integrating the iPads had a positive effect on teaching strategies.

The iPad tablets were being used by teachers and students in varied ways. Students used the devices in all of the classrooms, although the level of use was dependent on the teacher. Students generally used the iPads to complete course content, quickly access information, and to have content delivered electronically. Whereas some of these uses resulted in perceived benefits, others resulted in areas of concern. Areas of perceived benefit included processing content efficiently, and being prepared for the future modern technologies, as the iPad or other tablet devices will be around for years to come, and will likely evolve. Areas of perceived concern primarily included the perception of the iPad as a cause of distraction, the use of the tablets for other than school-related activities.

There was an observed small correlation between the teachers' prior teaching experience and depth of use in the classroom, but that there was no correlation between prior technology experience and the uses in the classroom.

Lastly, the perceived effect on student learning was described as reported by teachers, administrators, and students. Whereas students as a whole did not

report a positive or negative perceived effect on learning, students broken down by grade reported a decreased effect on learning as the grade level increased. Teachers did not report a perceived impact on student learning, although the administration did. Potential reason(s) for the difference in perception between the teachers and administration were explored. Additionally, reported and observed student uses were analyzed through the SAMR model, with the results indicating that very few of the activities could be considered transformative (Puentedura, 2006).

This final chapter will explore some key learnings that emerged from the findings, as well as present implications for future practice and research as a result of the findings.

Key Lessons Learned

There are several key lessons learned as a result of this study. These key learnings are derived from the findings and discussed below. Key learnings include: a) informed decision-making, b) recognizing teachers as learners; c) using tablets for learning; and d) using program evaluation to inform practice, both current and future. Several implications for practice and future research will be drawn from the learnings and will be expanded later in this chapter.

Decision-making should be informed. The hope for one-to-one tablet program implementation is that the iPads were provided and the students would

learn (Murray & Olcese, 2011; Thornwaite, 2016). This didn't happen at Odyssey. There were, indeed good intentions behind this initiative; considerable resources were spent on purchasing devices, and the teachers and administrators had positive hopes for the initiative. Administrators provided teachers and students with iPads, but most teachers and students did not perceive that using the tablets affected students' learning. Although the Principal at Odyssey wanted to adopt a one-to-one tablet initiative, it appears, however, that the initiative had yet to achieve these goals, perhaps because of inadequate professional development and lack of goal clarification and teacher buy-in to specific learning goals for the initiative.

Despite good intentions behind the initiative, and although each teacher and each student received an iPad to enhance instruction and learning, the ways in which teachers and students used the devices were inconsistent, and most teachers and students perceived that the initiative had little impact on learning. Few teachers articulated how they used devices to enhance student learning. Moreover, when I categorized all the classroom activities I observed as well as those described by teachers in interviews and by students on surveys using the SAMR model, few teaching and learning activities using iPads at Odyssey could be classified as transformative (Puentedura, n.d.). Instead, teachers and students used iPads primarily as a substitute for more traditional media such as

books, projected videos, face to face conversations, keyboards, or print resource materials.

To realize potential benefits from a technology initiative such as that implemented at Odyssey School, attitudes need to be changed, current paradigms for learning need to be addressed, and training needs to be thoughtful. Sadly, none of these happened at Odyssey. Prior literature on school technology leadership has emphasized the importance of developing, articulating, and communicating a shared vision of the intended change in general (Tearle, 2004) and school planning and vision with regard to technology in particular (Fishman & Pinkard, 2001; Hall & Hord, 2011; Lim & Khine, 2006). At Odyssey, neither the administrators nor the teachers indicated that either a vision or strategy in planning existed prior to implementation. Decisions may have been made based on what others were doing in the field, or which change or reform efforts were taking place in other schools.

There may have been assumptions taken for granted about the knowledge and skills necessary for a one-to-one program initiative. Judson (2006) and Chou et al. (2014) and Dogan & Almus (2014) found that professional development, for which the principal is chiefly responsible, is necessary to implement an initiative (Drago-Severson, 2007). The Odyssey School Principal acknowledged that she had little experience with technology, and she did not choose to lead professional development about how to use tablets to enhance

learning for her teachers. Instead, she hired the technology teacher and Assistant Principal, who had led professional development at other schools that implemented similar initiatives. Odyssey teachers were not educated or guided how to incorporate the iPads in to specific instructional activities. It appears that the Principal, likely from lack of technical knowledge, provided a lot of freedom but little direction to the technology teacher and assistant principal whom she hired to lead the initiative. Similarly, the Assistant Principal and technology teacher provided much freedom but little guidance to the teachers who were responsible for actually using the iPad tablets to enhance their students' learning. Ultimately, students also had more freedom than guidance about how to use the tablets for learning inside or outside the classroom.

How the teachers incorporated the tablet devices in their instructional practice varied greatly. There was no strategy to guide the implementation of this one-to-one technology initiative, and only one initial training session for teachers about how to use the iPads. Therefore, the only form of professional development they received was informal: the teachers sometimes learned from each other how their colleagues were using the devices in their classrooms.

The absence of a strategy for implementation also directly affected the students. Perhaps Odyssey School could have also planned and delivered training for students about how to use the iPads for their academic learning. One of the findings from this case study at a single private school was that student

uses of the iPad varied greatly, and variation in their uses were not always related to their teachers' intended uses in the classroom. Observations and the student survey revealed that Odyssey students did not share a common understanding of the ways that the devices should or could be used in the classroom to enhance their learning. Instead, students were to learn to use the iPad tablets. Given the widespread use of smartphones and tablets available for personal purchase, particularly by members of the students' generation, it should not be assumed that students can intuit appropriate school-related uses of the devices as they may have with personal uses. Much in the way that Odyssey teachers were left to learn the devices on their own, Odyssey students were also primarily responsible for learning on their own how to use the devices to accomplish their school work.

Teachers are learners, too. Teachers and administrators are also students, as well; professional learning is necessary for professional growth. Before implementing any program, it may be important to assume that teachers don't know what they don't know. A plan should be put in place for ongoing professional development, support for struggling adult learners, and potential issues that may arise during implementation (Day, 1999; Posavac, 2015). Leaders at Odyssey did not develop such a plan, and teachers were left without guidance from a plan. As a result, teachers came up with a varied set of uses for

the iPads in their teaching which ranged from simplistic to moderately sophisticated.

On the brighter side, teachers at Odyssey *were* using the devices with students; not a single teacher decided independently to avoid use of the iPads. In fact, teachers were generally excited about the program and the implementation. Having the courage to jump in to such an initiative is admirable; Most Odyssey teachers showed they were willing to take some risks to use the tablets at all in their instruction.

That said, what does the Odyssey School case study illustrate about how teachers might learn from the other teachers who are using new technologies in effective ways? While the teachers were sharing uses informally at Odyssey School, implementation could also have been happening strategically. The Odyssey School case reveals that meaningful and useful professional sharing may not happen without a clear plan, including goals for teachers' as well as students' learning.

Periodic professional development sessions could include times for teachers to detail the ways they use in the classroom, but these sharing sessions should be focused and topic-driven in order to guide professional learning (Chou et al. 2014; Dogan & Almus, 2014).

By addressing professional learning, there would be greater potential for a positive effect of the use of one-to-one technology initiative on teaching strategies. My classroom observations revealed that most Odyssey teachers were using the iPads in some fashion in their classrooms but were either unaware of how to articulate how using the devices had changed their teaching or could no longer imagine their teaching practice without incorporating the iPads. Either way, they may have failed to realize the full impact of use of the iPad tablets on the ways they taught their students. Perhaps teachers would be better able to recognize the effect that the iPad has had on their teaching strategies if they were unable to teach without the iPads for a period of time.

Drago-Severson (2007), Fried (2008), Dogan & Almus (2014), and Karsenti & Fievez (2013) also found that without substantial professional development, teachers were not likely to see an effect on teaching strategies. Teachers did not indicate that the lack of professional development had negatively affected their opportunities to teach effectively using the iPad tablets which again indicates that teachers may have been simply unaware of what was possible upon program implementation.

As indicated in the findings, Mr. Burman said that he has “learned a lot of how to use the devices from the students.” This is a paradigm shift in education; students who would have traditionally relied on the teacher for information were

now teaching instructors how to use learning tools in the classroom, which also points to the fact that teachers are learners, too.

Using tablets for learning. Contrary to what the teachers said during interviews and what students said in response to survey questions, I observed the students actually using the devices for learning in the classroom, particularly with differentiated learning, project-based learning, and self-directed learning (DuFour & Marzano, 2015; Levy, 2008; Zimmerman & Schunk, 2012). Although teachers did not indicate that their teaching strategies were altered as an effect of having the tablet devices available, they did allow students to use them. Such a choice is a teaching strategy. Teachers choose which tools and methods to enhance student learning (Entwistle & Ramsden, 2015). At Odyssey, teachers chose to allow students to use the tablets, albeit there was no solid direction on how to do so.

The activities observed and described at Odyssey School that were categorized according to the SAMR model can be related to what is known from prior research about effective teaching strategies. Most of teaching strategies and learning activities at Odyssey were categorized in to the ‘Substitution’ and ‘Augmentation’ categories, meaning that the technology acts as a direct tool substitute, with no functional change or functional change, respectively (Puentedura, n.d.). However, with some professional development and administrative support, teachers could begin to incorporate activities that

exemplify the 'Modification' or 'Redefinition' categories, meaning that the technology could allow for significant task redesign or the creation of new and previously inconceivable tasks, respectively (Puentedura, n.d.). According to Grigorenko & Sternberg (2016), teachers that routinely involve analytical, critical thinking, and problem-solving in to their practices have a higher level of engagement and achievement. Teachers and administrators at Odyssey and similar schools could find ways to incorporate the iPads that routinely involve analysis and critical thought. With the number of apps regularly increasing, finding tools and software for which to do so might not be difficult.

By making connections between the SAMR model and effective teaching strategies that prior research shows leads to learning, teachers and administrators at Odyssey school could continue to implement this one-to-one tablet initiative, but in a fashion that could have demonstrable impact on perceived and actual student learning.

Chou et al. (2014) found that a notable use of the iPad in terms of content creation is its strength with graphics and visual arts creativity. Students at Odyssey school were observed creating content with emphasis on visual arts instead of text. Odyssey teachers also noted this strength. Creating content alone might be listed low in the hierarchy of the SAMR model, but what students do with the created content could be cause for a higher level of categorization within the structure. For example, simply creating a document, or writing an

essay, can be done without the tablets. Students could use a computer, or they could manually hand-write the essay. There is very little functional change, if any, to using the tablet to create an essay. However, if students are collaborating on an essay in real-time, which can be done with cloud-based software accessed by the tablet, while simultaneously recording the collaboration with an app that records live activity, the totality of the moment's learning activity would be higher on the SAMR model hierarchy, signifying likely greater learning gains. Without using the tablet device, the students would not be able to synchronously work and record using the same device. The combination of activities elevates the likely learning as well as the designation on the SAMR model. Teachers and administrators at Odyssey could continue to seek opportunities for awareness and professional development that connects what is known from research about teaching for effective learning to the transformative levels of the SAMR model.

Chou et al. (2014), Kontkanen et al. (2016), and Karsenti & Fievez (2013) all found that the iPads are more useful than computers since textbooks can be online. However, at Odyssey school, the online math textbook was not perceived as valuable. Students and teachers indicated that physical textbooks would be easier to manipulate. Perhaps if the particular online math series had been adapted specifically for the iPad in an interactive fashion, the math teacher, Ms. Kane, at Odyssey school would have had a more favorable experience with the

online textbook. Of note, not a single student commented on the survey that he or she did not like the online math textbook, Perhaps the students did not mind that it takes them longer to find information, or perhaps they did not even notice.

Teachers at Odyssey indicated that they perceived little or no impact on student learning from using the iPads for instruction. On the other hand, perhaps they had become used to iPad use in the classroom that they were unable to see if such an impact exists compared with their prior ways of teaching.

Program evaluation informs practice. Program evaluation should showcase the development of the teachers when implementing new initiatives because teacher training is directly associated with student learning (Bransford et al., 1999; DeMonte, 2013; DuFour & Marzano, 2015). At Odyssey, no such program evaluation had taken place in order to inform future practice. A program evaluation could help the stakeholders at Odyssey determine what is working well, what could use improvement, and how best to improve any shortcomings in the tablet initiative (Royce, Thyer, & Padgett, 2015).

Program evaluation is useful to determine a level of effectiveness when implementing a particular program or initiative (Posavac, 2015). At the time of this study, Odyssey was in the third year of the iPad initiative, and a program evaluation would have been valuable in order to inform future practice. Although this study serves as a form of program evaluation, an internal program evaluation

would also be useful for administrators and teachers to engage in evaluation of their initiative so to better inform future practice.

Although an internal program evaluation had not been conducted, this study can serve as a program evaluation to stimulate ideas for improvement at Odyssey School and to inform other schools who either have yet to implement such an initiative or who are currently in a phase of implementation. In particular, this study can inform stakeholders of independent and private schools, as previous studies have focused on tablet implementation in public schools, where access resources is greater than in independent schools (Davies & Davies, 2014).

Implications for Practice

There are several implications for practice, or recommendations, as a result of this study. The implications for practice are suggestions for action and describe how leaders can apply the findings of this study for implementation of a one-to-one tablet initiative.

Time allotment. Initiative or program leaders should provide ample time for teachers to learn a new technology prior to the launch of any technology initiative. By allowing teachers time to learn how to use the devices, leaders should also be clear to provide guidance to teachers about how the technology could be and should be used in the classroom. Professional development can act as a follow-up to this time with the goal of providing all teachers with the

same information, at the same time, necessary to determine next steps prior the launching the initiative.

Focus. Leaders should provide a clear focus of the initiative, including reason, philosophy, timeline, and specific expectations. The focus should be presented before teachers are exposed to the new technology, and teachers should be allowed to influence the initiative's timeline, related professional development activities, and perhaps even the goals and expectations. Such consultation with teachers is likely to increase their interest and buy-in to the initiative. Ongoing support should be provided throughout the initiative that directly relates to the primary focus of the initiative. Furthermore, reasons for all actions and activities should be clear and concise and shared with all involved stakeholders. Leaders should be aware that implementing a new technology involves change and disruption for the teachers, so they should support the initiative in an ongoing and meaningful way that reflects and anticipates needs from the teachers and other stakeholders.

Define teaching strategies. Many teachers in this study were either unaware of effect of using iPad tablets on their teaching strategies or were not able to articulate any changes. This finding suggests that prior to such an initiative, leaders should develop a list of teaching strategies for teachers to be aware of strategies currently being used. During implementation of the initiative, teachers should be encouraged to remain aware of any effect that

implementation has on their prior teaching strategies and how the new initiative changes their current and future teaching. Strategies should include, but not be limited to: planning and preparation, instructional strategies, resources, pacing, instructional tools, methodology, assessment strategies, and professional responsibilities related to teaching.

Online instructional tools and related resources. Teachers and leaders should continuously explore online resources; particularly textbooks that can be accessed in a meaningful and interactive way with iPads or other mobile computing devices. In a one-to-one iPad initiative all students are afforded an iPad, so an online instructional tool or individualized resource is appropriate given the technology capabilities. The participants in this study used a math series disliked by the math teacher; a careful analysis of the benefits, limitations, and opportunities of a breadth of resources should be considered and continually evaluated during implementation and development.

Distraction. Based on the results of this study, all stakeholders at schools implementing similar initiatives can anticipate that iPads or other tablet devices provide an opportunity for students to be distracted from their classroom tasks. Nearly every study discussed in Chapter Two that gathered data from teachers and students reported student distraction as a major opposition to using tablets (Diemer, 2013; Eid & Al-Zuhair, 2015; Ferguson, 2016; Karsenti & Fievez, 2013; Rossing et al., 2012, Smith & Santori, 2015, Singer, 2015). Students and

teachers alike noted that the devices were highly likely to cause a distraction since they were readily available and playing games was an option (Eid & Al-Zuhair, 2015; Karsenti & Fievez, 2013; Singer, 2015). Similar to these studies is the finding at Odyssey that about one-fifth of the students volunteered that they played games and were, as such, distracted.

However, previously noted in this chapter, the nature of 'distraction' must be defined. If students are truly distracted by the devices, then options must be explored to work with students in order to avoid and prevent distractions. If teachers perceive that are students distracted, but students are actually multitasking by finding information that supplements the classroom lesson, then professional development must be provided to teachers to help them develop appropriate responses to such behavior given the context of the classroom and the teacher's expectations.

Perceived effect on student learning. Leaders and teachers should describe and analyze tenets of student learning prior to the implementation of any technology initiative. These stakeholders should then be aware of how student learning is changing, progressing, or regressing during initial and ongoing implementation of the initiative. Results should be shared with all stakeholders, including students, so that they are able to articulate their perceptions of effects of the initiative on student learning.

Implications for Future Research

As a result of the findings of this study, there are several recommendations for future studies. Qualitative, quantitative, and mixed-methods studies should all be considered based on the specific research questions that future research is attempting to answer.

Perceived effect on student learning. A case study approach was appropriate for this exploration of the iPad initiative at Odyssey School, as outlined in chapter three. In order to ascertain if the findings from this case study are transferable to other private schools and other types of schools, additional studies should be considered with a similar or same research question at different sites. The recommendation regarding defining student learning and impacts should be followed for the most valid and reliable data collection and subsequent analysis.

Students in this study reported that there was less of a perceived effect on learning as the students progressed through grade levels. Future research should focus on why the decreased perception increases as students age and progress. Studies should also focus on the what student learning is, from the vantage point of administrators, teachers, and students. There is not a good consensus of how to measure student learning between practitioners or scholars. The function of memory as a part of learning should also be explored, as

students are not expected to memorize as much material, as the tablets provide instant access to information.

Effect on teaching strategies. Researchers should investigate further the effect of a one-to-one iPad on teaching strategies. This study attempted to answer the research question: “Under what conditions do teachers take up and integrate in to their practice a new technology initiative?” Future studies could focus directly on lasting effects on teaching strategies, post-implementation.

Professional development. This case study did not assess the specific professional development provided at Odyssey School, although the study did find the training was likely inadequate to help teachers design teaching strategies using the iPads. Future research should explore what professional development activities are necessary and important for the implementation of a one-to-one tablet initiative. Future studies could evaluate professional development activities as a stand-alone activity, or relate different types of professional development to changes in teaching strategies, and their impact on student learning.

Distraction or positive multitasking. Several teachers in this case study at Odyssey School perceived that students were sometimes distracted by having continual access to their iPads. Future studies could explore the definition of, limitations of, and factors related to distraction. Related to distraction, research should also explore whether and when students are multi-tasking, which could

appear as a form of distraction. They might also investigate if such multitasking in class leads to students being able to multi-task more frequently, and how the multi-tasking relates to in-depth thought process.

One has to wonder what causes the teachers to see the tablets as distractions in the classroom. Many teachers noted that a benefit to the device was access to information; most teachers noted that they could also be distracting. On one hand, the fact that students are encouraged to access information real-time or quickly might come across as distracted if students were not instructed to do so at a particular moment. On the other hand, would asking students to access information teach them to utilize that practice when not instructed – which the teachers might note as distraction? Could students simply be accessing information quickly, and yet the teacher is expecting a student to sit quietly without the device at a particular time? If so, then efficiency and distraction are related.

So, are the students actually more distracted with the devices? Or are they just practicing efficiency? Or are the teachers wrong and assuming something that is not? This study did not focus on any of those questions, but it is certainly worth pursuing such questions for future research.

SAMR. The SAMR model has not yet been tested in research using experimental or quasi-experimental designs. As a result, I found deciding which categories into which I should place learning activities was not always simple.

Future research should focus on how best to categorize activities, provide quantification for effect by SAMR category on student learning, or statistical evidence for the use of the SAMR model to examine program effectiveness. The results of any additional SAMR research could then better be used in practice or to inform future studies.

Student learning. A quantitative or mixed-methods study could focus on whether there is significant statistical evidence that a one-to-one iPad initiative impacts student learning and/or achievement. Measures that could be used to assess student learning are summative in nature, such as standardized testing, or some form of quantitative measure that shows statistically significant learning and/or achievement growth.

Conclusion

The findings of this case study revealed several lessons. Decision-making, particularly related to an initiative, should be informed by others' experiences, a plan of what is hoped to accomplish, and what the stakeholders should experience and witness as a result. Professional development initiatives and program expectations should be outlined prior to the initiative, and a program evaluation should be put in place to assess initiative after implementation. Recognizing that teachers learn and grow throughout an initiative is useful in planning and preparing for steps that lead to implementation and potential

setbacks after implementation. By learning from others' cases, schools can gain a sense of what those steps and potential setbacks may be.

As stated in Chapter Three, a case study is useful to generate knowledge about the case or phenomenon being studied; the findings are not generalizable to populations, but rather, inform others outside of the case (Patton, 2015). That said, many issues have surfaced that have implications not just for future practice but also for future research that is needed.

School administrators, teachers, and researchers can and should take from this case study the key learnings in order to inform future practices, particularly those in independent school settings. As a result of this study, teachers and administrators of independent schools should recognize that the one-to-one tablet program at Odyssey School can assist in potential program implementation for those who may be considering the initiative or are in the initial stages of implementation. There is hope for the future that administrators and teachers continue to use the results of this study, as well as other research, to assist in determining why and how to implement similar programs in their own setting.

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APPENDIX A: Email Memo Research Request

Email Memo to Principals of Diocese of Madison for Research Site Request

To: Principals, Diocese of Madison
From: Michael Flanagan
RE: Research Site

Principals,

As part of my doctoral program, I am currently on the final part of my program as I work towards completing the doctoral dissertation. I am seeking a research site that will be used as the sample for my research.

I am doing a case study in which I am researching the impacts of the one-to-one iPad initiative in which the school issues every student in (a) particular grade level(s) an iPad as part of daily instruction. In particular, I am seeking answers to the following research questions:

- Under what conditions to teachers take up and implement a new technology initiative?
- What perceived effect does a 1:1 iPad initiative have on student learning?

In order to accomplish this, I will need to conduct interviews of teachers / administrators, observe students in the classroom, and conduct an anonymous, online student survey.

Your participation would be valuable to the field of education. Those interested in participating would need to be in at least year two of the iPad initiative, and year three or four would be ideal. Please know that the results of this study will not impact future programming or allocation of resources in the Diocesan schools.

If you are interested in your school as the research site, please contact me at Michael.flanagan@madisondiocese.org. If you have any questions or concerns, please do not hesitate to contact me.

Thank you for your attention to this matter.

Michael Flanagan

APPENDIX B: Teacher Interview Protocol

Teacher Interview Interview Protocol

Study Title: The effects of a one-to-one iPad initiative: A case study

Protocol: One-on-one in-depth interview

Directions for Interview:

Before the Interview:

- Check the equipment and make sure you know how to operate the recorder
- Plan to arrive early
- Make certain that the room is free from interruption and undue noise
- Review the protocol, and send questions to interviewee, if necessary

Goal of Interview:

The primary purpose of the Teacher Interview is to gain the perception of implementation of the iPad initiative, understand under what conditions the teacher took up and integrated in to their practice the initiative, and to provide examples of how the implementation is being utilized at the classroom level. Additionally, the goal of the interview is to understand the teacher's evaluation of the overall development of the initiative, and what effect the initiative has on student learning.

As an interviewer, the primary responsibility is to ask questions, listen, and probe. The following questions are sample-probing questions and are not suggested to be asked verbatim. Furthermore, additional probing may be necessary, depending on the depth and quality of the answer given. Do not assume, at any time, that the answer is complete until appropriate data has been gained. The end goal is to deepen the level of understanding of the probing questions, rather than to provide simple answers to questions that do not deepen a level of understanding from a research perspective.

Introduction and Consent:

Introduce yourself as a doctoral student at the University of Wisconsin-Milwaukee in the program of Administrative Leadership. Note that you are the primary investigator, but you are acting as a doctoral candidate, not an actual researcher on behalf of the department. Explain that informed consent is necessary, hand out the informed consent form. Answer any questions, as necessary, and collect the signed form.

Explain that, over the next hour, you will pose questions that ask the interviewee to reflect on the experiences of implementing and supporting a one-to-one iPad initiative. Answers are neither correct nor incorrect, and more interest is placed in thoughts than in simple answers, so please expand as completely as possible. At times, the same question may be asked in a couple of different ways, so please be patient and answer as best you can.

APPENDIX B: Teacher Interview Protocol

Permission to audiotape

Ask the respondent if it is permissible to audiotape the interviewer, if applicable. If so, do not forget to turn on the recorder.

Research Questions:

1. Under what conditions do teachers take up and integrate into their practice a new technology initiative?
2. What perceived effect does a 1:1 iPad Initiative have on student learning?

Interview Questions

Part 1: Previous Experience (*rapport building*)

What is your previous experience with technology? With iPads? In what ways have you witnessed technology and iPads used in the classroom, previous to the initiative? What are other contributing factors, from previous experience, that have led you to where you are today?

Part 2: Implementation (*research question #1*)

What was your response to the initiative? How did you implement the initiative? What were some changes to your curriculum and/or teaching strategies? What did you need to learn in order to take up the initiative? Did you feel ready for the implementation? What were factors that positively impacted or limited the implementation?

Part 3: Uses (*research questions #1,#2*)

How are students using the devices in your class? What has been the impact on your teaching? Are you delivering content differently? What have been the impacts on the students?

Part 4: Student Learning (*research question #2*)

How has the initiative impacted student learning?

Conclusion

Ask the participant if there are any remaining thoughts or comments not covered in the interview, to this point. When concluded, thank the participant, turn off the recorder, collect the recorder, and ask if it is permissible to contact to clarify points in the interview and/or seek future involvement.

APPENDIX C: Administrator Interview Protocol

Administrator Interview Interview Protocol

Study Title: The effects of a one-to-one iPad initiative: A case study

Protocol: One-on-one in-depth interview

Directions for Interview:

Before the Interview:

- Check the equipment and make sure you know how to operate the recorder
- Plan to arrive early
- Make certain that the room is free from interruption and undue noise
- Review the protocol, and send questions to interviewee, if necessary

Goal of Interview:

The primary purpose of the Administrative Interview is to gain the Administrator's perception on the reasoning for implementing a one-to-one iPad initiative at the classroom level, provide previous experiences that led to the decision for implementation, and to gain a list of Professional Development that the Administrator has either delivered / implemented or subcontracted, as necessary. Additionally, the goal of the interview is to understand the Administrator's evaluation of the overall development of the initiative, and what impact the initiative has had on student learning.

As an interviewer, the primary responsibility is to ask questions, listen, and probe. The following questions are sample-probing questions and are not suggested to be asked verbatim. Furthermore, additional probing may be necessary, depending on the depth and quality of the answer given. Do not assume, at any time, that the answer is complete until appropriate data has been gained. The end goal is to deepen the level of understanding of the probing questions, rather than to provide simple answers to questions that do not deepen a level of understanding from a research perspective.

Introduction and Consent:

Introduce yourself as a doctoral student at the University of Wisconsin-Milwaukee in the program of Administrative Leadership. Note that you are the primary investigator, but you are acting as a doctoral candidate, not an actual researcher on behalf of the department. Explain that informed consent is necessary, hand out the informed consent form. Answer any questions, as necessary, and collect the signed form.

Explain that, over the next hour, you will pose questions that ask the interviewee to reflect on the experiences of implementing and supporting a one-to-one iPad initiative. Answers are neither correct nor incorrect, and more interest is placed in thoughts than in simple answers, so please expand as completely as possible. At times, the same question

APPENDIX C: Administrator Interview Protocol

may be asked in a couple of different ways, so please be patient and answer as best you can.

Permission to audiotape

Ask the respondent if it is permissible to audiotape the interviewer, if applicable. If so, do not forget to turn on the recorder.

Research Questions:

1. Under what conditions do teachers take up and integrate into their practice a new technology initiative?
2. What perceived effect does a 1:1 iPad Initiative have on student learning?

Interview Questions

Part 1: Previous Experience (*rapport building*)

What is your previous experience with technology? With iPads? In what ways have you witnessed technology and iPads used in the classroom, previous to the initiative? What are other contributing factors, from previous experience, that have led you to where you are today in terms of leading a technology initiative? What are some considerations when leading a particular technology initiative with teachers?

Part 2: Leading Teachers (*research question #1*)

What are some considerations when leading a particular technology initiative with teachers? What were the teachers' needs? How did you help meet those needs? How did teachers respond to the initiative? Were you ready for the implementation? Were the teachers ready for the implementation? What was the change process within the initiative while the teachers adopted this new technology?

Part 3: Uses (*research questions #1,#2*)

How are students using the devices in class? What has been the impact on your teachers in terms of their teaching?

Part 4: Student Learning (*research question #2*)

How has the initiative impacted student learning?

APPENDIX C: Administrator Interview Protocol

Conclusion

Ask the participant if there are any remaining thoughts or comments not covered in the interview, to this point. When concluded, thank the participant, turn off the recorder, collect the recorder, and ask if it is permissible to contact to clarify points in the interview and/or seek future involvement.

APPENDIX D: Observation Protocol

Classroom Observation Protocol

Study Title: The effects of a one-to-one iPad initiative: A case study

Protocol: Classroom Observation

Directions for Observation:

Before the Observation:

- Plan to arrive early
- Make certain that the room is free from interruption and undue noise
- Review the protocol, and prepare note-taking equipment, as necessary

Goal of Observation:

The primary purpose of the Classroom Observation is to witness the student and teacher uses of the iPads. In particular, using Apple's (2015) uses of the devices, the goal of the observation is to see if the devices are actually being used as intended and/or perceived, in conjunction with the teacher and administrator interviews.

Introduction and Consent:

Introduce yourself as a doctoral student at the University of Wisconsin-Milwaukee in the program of Administrative Leadership. Note that you are the primary investigator, but you are acting as a doctoral candidate, not an actual researcher on behalf of the department. Explain that informed consent is necessary, and collect the consent forms that were previously sent home with students.

Explain that, over the next hour, you will simply be observing the interactions between the students, the teacher, and witness the uses of the devices. Ask the students to participate in class activities as normally as possible, and assure students that the observation is not meant to distract in any manner.

Research Questions:

1. Under what conditions do teachers take up and integrate into their practice a new technology initiative?
2. What perceived effect does a 1:1 iPad Initiative have on student learning?

APPENDIX D: Observation Protocol

Protocol Notes:

<i>Area of Interest</i>	<i>Related Research Question</i>	<i>Notes</i>
Content Delivery	1,2	
Personalized Content	1	
Production	1,2	
Creativity	1,2	
Flexible Teaching	2	

APPENDIX E: Student Online Survey Questions

Student Survey Survey Questions

Study Title: The effects of a one-to-one iPad initiative: A case study

Protocol: Survey Questions

1. How well does your iPad help you learn in class? (1-5 scale)

(not well at all) 1 2 3 4 5 (extremely well)

2. How well does using your iPad help you participate in class? (1-5 scale)

(not well at all) 1 2 3 4 5 (extremely well)

3. What apps do you most frequently use?

4. How do you use these apps?

5. What are the most constructive uses of your iPad?

6. What are you able to do with your iPad that you are unable to do without it?

APPENDIX F: Informed Consent (adult administrator)

Informed Consent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

University of Wisconsin – Milwaukee Consent to Participate in Research

Study Title: The effects of a one-to-one iPad initiative: A case study

Persons Responsible for Research: Michael Flanagan, Department of Administrative Leadership, Student Principal Investigator
Dr. Latish Reed, Department of Administrative Leadership, Principal Investigator

Study Description: The purpose of this study is to describe how teachers respond to a new technology initiative, as well as describe what perceived effects a one-to-one iPad initiative has on student learning. Approximately 155 subjects will participate in this study. If you agree to participate, you will be interviewed regarding your experiences and conditions reflective of the iPad experience. This will take approximately two hours of your time. The interview will be audiotaped, and the audio file will be disposed after it is transcribed.

Risks / Benefits: Risks that you may experience from participating are considered minimal. There are no costs for participating. There are no benefits to you other than to further research.

Confidentiality: Identifying information such as your name, email, etc. will be collected for research purposes in order to link data collection points. Your responses will be treated as confidential and all reasonable efforts will be made so that no individual participant will be identified with his/her answers. The research team will remove your identifying information after linking the data and/or during transcription, and all study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses. Data from this study will be saved on a password-protected and encrypted computer through the duration of the study. Only the Principal Investigator, Dr. Latish Reed, and Student Principal Investigator, Michael Flanagan, will have access to your information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records. Data will be kept in a confidential manner as property of UW-Milwaukee.

Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee. Participating will not impact your relationship with the school.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Michael Flanagan at flanag28@uwm.edu.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu.

APPENDIX F: Informed Consent (adult administrator)

Informed Consent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must be 18 years of age or older. By signing the consent form, you are giving your consent to voluntarily participate in this research project.

Printed Name of Subject/Legally Authorized Representative

Signature of Subject/Legally Authorized Representative

Date

APPENDIX G: Informed Consent (adult teacher)

Informed Consent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

University of Wisconsin – Milwaukee Consent to Participate in Research

Study Title: The effects of a one-to-one iPad initiative: A case study

Persons Responsible for Research: Michael Flanagan, Department of Administrative Leadership, Student Principal Investigator
Dr. Latish Reed, Department of Administrative Leadership, Principal Investigator

Study Description: The purpose of this study is to describe how teachers respond to a new technology initiative, as well as describe what perceived effects a one-to-one iPad initiative has on student learning. Approximately 155 subjects will participate in this study. If you agree to participate, you will be asked to be observed in the regular teaching environment while students use their iPads routinely, and be interviewed regarding your experiences and conditions reflective of the iPad experience. This will take approximately two hours of your time, not counting the observation time. The interview will be audiotaped, and the audio file will be disposed after it is transcribed.

Risks / Benefits: Risks that you may experience from participating are considered minimal. There are no costs for participating. There are no benefits to you other than to further research.

Confidentiality: Identifying information such as your name, email, etc. will be collected for research purposes in order to link data collection points. Your responses will be treated as confidential and all reasonable efforts will be made so that no individual participant will be identified with his/her answers. The research team will remove your identifying information after linking the data and/or during transcription, and all study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses. Data from this study will be saved on a password-protected and encrypted computer through the duration of the study. Only the Principal Investigator, Dr. Latish Reed, and Student Principal Investigator, Michael Flanagan, will have access to your information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records. Data will be kept in a confidential manner as property of UW-Milwaukee.

Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee. Participating will not impact your relationship with the school.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Michael Flanagan at flanag28@uwm.edu.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu.

APPENDIX G: Informed Consent (adult teacher)

Informed Consent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must be 18 years of age or older. By signing the consent form, you are giving your consent to voluntarily participate in this research project.

Printed Name of Subject/Legally Authorized Representative

Signature of Subject/Legally Authorized Representative

Date

APPENDIX H: Informed Consent (parent / guardian e-sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

UNIVERSITY OF WISCONSIN – MILWAUKEE PARENTAL CONSENT FOR CHILD TO PARTICIPATE IN RESEARCH

THIS CONSENT FORM HAS BEEN APPROVED BY THE IRB FOR A ONE YEAR PERIOD

1. General Information

Study title:

The effects of a one-to-one iPad initiative: A case study

Persons in Charge of Study (Principal Investigator):

Michael Flanagan, Department of Administrative Leadership, Student Principal Investigator
Dr. Latish Reed, Department of Administrative Leadership, Principal Investigator

2. Study Description

Your child is being asked to participate in a research study. Your child's participation is completely voluntary. Your child does not have to participate if you do not want him/her to participate.

Study description:

The purpose of this study is to describe how teachers respond to a new technology initiative, as well as describe what effects a one-to-one iPad initiative has on student learning. The study will be conducted in November and December, 2015, at your child's school. Students will be observed in the regular classroom environment.

3. Study Procedures

What will I be asked to do if I participate in the study?

If you agree to allow your child to participate, he or she will be asked to be observed in the regular classroom environment, and participate in a survey.

APPENDIX H: Informed Consent (parent / guardian e-sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

4. Risks and Minimizing Risks

What risks will my child face by participating in this study?

There are no known risks for participating in this research study.

5. Benefits

Will my child receive any benefit from my participation in this study?

There are no benefits to you other than to help the researchers learn something new.

6. Study Costs and Compensation

Will I or my child be charged anything to participate in this study?

You will not be responsible for any of the costs from taking part in this research study.

Will I or my child be paid or given anything for being in the study?

You will not be paid for taking part in this research study.

7. Confidentiality

What happens to the information collected?

All information collected about your child during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. Information that identifies your child personally will not be released without your written permission. Only the Principal Investigator and sponsor, Dr. Latish Reed, and the Student Principal Investigator, Michael Flanagan will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review your child's study related records.

Your child's survey information will be anonymous and will be stored in cloud-based Survey Monkey, with only Principal Investigator Dr. Latish Reed and/or Student Principal Investigator Michael Flanagan having access to the confidential password to gain access to the anonymous data.

APPENDIX H: Informed Consent (parent / guardian e-sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

8. Alternatives

Are there alternatives to participating in the study?

There are no known alternatives available to your child other than not taking part in this study.

9. Voluntary Participation and Withdrawal

What happens if I decide not to allow my child to be in this study?

Your child's participation in this study is entirely voluntary. You may choose not allow your child to take part in this study. If you decide to allow your child take part, you can change your mind later and withdraw him/her from the study. In addition, your child will also be asked whether he/she would like to participate in the research study by reading and signing an assent form which describes the study. Your child will be free to not answer any questions or withdraw at any time. Your and your child's decision will not change any present or future relationships with the University of Wisconsin Milwaukee. If your child withdraws or is withdrawn early, we will use the information collected to that point. Furthermore, his or her refusal to take part in the study will not affect his or her grade or class standing. Participating will not impact his or her relationship with the school.

10. Questions

Who do I contact for questions about this study?

For more information about the study or the study procedures or treatments, or to withdraw your child from the study, contact:

Michael Flanagan
6050 Windflower Way
Roscoe, IL 61073

Who do I contact for questions about my child's rights or complaints about my child's treatment as a research subject?

The Institutional Review Board may ask your name, but all complaints are kept in confidence.

Institutional Review Board
Human Research Protection Program
Department of University Safety and Assurances
University of Wisconsin – Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-3173

APPENDIX H: Informed Consent (parent / guardian e-sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

11. Audio or Video recording or Photographs

Consent to Audio/Video/Photo Recording:

It is okay to audiotape/videotape my child while he/she is in this study and use my child's audiotaped/videotaped data in the research.

(Electronic signatures will be collected in order to provide consent specific to audio/video/photo recording. Electronic signatures will be collected via a separate Google Form, which will be sent out to the email address provided to the school)

12. Signatures

Parental/Guardian Consent:

Electronic signatures will be collected via a separate Google Form, which will be sent out to the e-mail address provided to the school. An electronic signature indicates consent within the terms below.

I have read or had read to me this entire consent form, including the risks and benefits. I have had all of my questions answered. I understand that I may withdraw my child from the study at any time. I am not giving up any legal rights by signing this form. I am signing below to give consent for my child to participate in this study.

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Printed Name of Person Obtaining Consent

Study Role

Signature of Person Obtaining Consent

Date

APPENDIX I: Informed Consent (parent / guardian physical sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

UNIVERSITY OF WISCONSIN – MILWAUKEE PARENTAL CONSENT FOR CHILD TO PARTICIPATE IN RESEARCH

THIS CONSENT FORM HAS BEEN APPROVED BY THE IRB FOR A ONE YEAR PERIOD

1. General Information

Study title:

The effects of a one-to-one iPad initiative: A case study

Persons in Charge of Study (Principal Investigator):

Michael Flanagan, Department of Administrative Leadership, Student Principal Investigator
Dr. Latish Reed, Department of Administrative Leadership, Principal Investigator

2. Study Description

Your child is being asked to participate in a research study. Your child's participation is completely voluntary. Your child does not have to participate if you do not want him/her to participate.

Study description:

The purpose of this study is to describe how teachers respond to a new technology initiative, as well as describe what effects a one-to-one iPad initiative has on student learning. The study will be conducted in November and December, 2015, at your child's school. Students will be observed in the regular classroom environment.

3. Study Procedures

What will I be asked to do if I participate in the study?

If you agree to allow your child to participate, he or she will be asked to be observed in the regular classroom environment, and participate in a survey.

APPENDIX I: Informed Consent (parent / guardian physical sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

4. Risks and Minimizing Risks

What risks will my child face by participating in this study?

There are no known risks for participating in this research study.

5. Benefits

Will my child receive any benefit from my participation in this study?

There are no benefits to you other than to help the researchers learn something new.

6. Study Costs and Compensation

Will I or my child be charged anything to participate in this study?

You will not be responsible for any of the costs from taking part in this research study.

Will I or my child be paid or given anything for being in the study?

You will not be paid for taking part in this research study.

7. Confidentiality

What happens to the information collected?

All information collected about your child during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. Information that identifies your child personally will not be released without your written permission. Only the Principal Investigator and sponsor, Dr. Latish Reed, and the Student Principal Investigator, Michael Flanagan will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review your child's study related records.

Your child's survey information will be anonymous and will be stored in cloud-based Survey Monkey, with only Principal Investigator Dr. Latish Reed and/or Student Principal Investigator Michael Flanagan having access to the confidential password to gain access to the anonymous data.

APPENDIX I: Informed Consent (parent / guardian physical sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

8. Alternatives

Are there alternatives to participating in the study?

There are no known alternatives available to your child other than not taking part in this study.

9. Voluntary Participation and Withdrawal

What happens if I decide not to allow my child to be in this study?

Your child's participation in this study is entirely voluntary. You may choose not allow your child to take part in this study. If you decide to allow your child take part, you can change your mind later and withdraw him/her from the study. In addition, your child will also be asked whether he/she would like to participate in the research study by reading and signing an assent form which describes the study. Your child will be free to not answer any questions or withdraw at any time. Your and your child's decision will not change any present or future relationships with the University of Wisconsin Milwaukee. If your child withdraws or is withdrawn early, we will use the information collected to that point. Furthermore, his or her refusal to take part in the study will not affect his or her grade or class standing. Participating will not impact his or her relationship with the school.

10. Questions

Who do I contact for questions about this study?

For more information about the study or the study procedures or treatments, or to withdraw your child from the study, contact:

Michael Flanagan
6050 Windflower Way
Roscoe, IL 61073

Who do I contact for questions about my child's rights or complaints about my child's treatment as a research subject?

The Institutional Review Board may ask your name, but all complaints are kept in confidence.

Institutional Review Board
Human Research Protection Program
Department of University Safety and Assurances
University of Wisconsin – Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-3173

APPENDIX I: Informed Consent (parent / guardian physical sign)

Informed Consent

IRB Protocol Number: 16.109

Version: 1.0

IRB Approval Date: 10/21/2015

11. Audio or Video recording or Photographs

Consent to Audio/Video/Photo Recording:

It is okay to audiotape/videotape my child while he/she is in this study and use my child's audiotaped/videotaped data in the research.

Please initial: ____ Yes ____ No

12. Signatures

Parental/Guardian Consent:

I have read or had read to me this entire consent form, including the risks and benefits. I have had all of my questions answered. I understand that I may withdraw my child from the study at any time. I am not giving up any legal rights by signing this form. I am signing below to give consent for my child to participate in this study.

Printed Name of Child Participant

Printed Name of Parent/Guardian

Signature of Parent/Guardian

Date

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Printed Name of Person Obtaining Consent

Study Role

Signature of Person Obtaining Consent

Date

APPENDIX J: Child Assent

Assent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

UNIVERSITY OF WISCONSIN – MILWAUKEE ASSENT TO PARTICIPATE IN RESEARCH

Study title: The effects of a one-to-one iPad initiative: A case study

Person in Charge of Study: Michael Flanagan, Department of Administrative Leadership, Student Principal Investigator
Dr. Latish Reed, Department of Administrative Leadership, Principal Investigator

We are doing a research study. A research study is a way to learn more things. We are trying to learn more about how you use an iPad in school. If you decide that you want to be part of this study, you will be asked to use the iPad as you would normally, and perhaps answer some questions from the person in charge of the study.

There are no parts of the study that might hurt or upset you.

We don't know if this study will help you. We hope to learn something that will help other people some day.

You don't have to be in this study. It is up to you and no one will be mad at you. Your grade in this class or your relationship with your teacher will not change if you do or do not choose to be in the study. If you say yes now, but change your mind later, that's okay too. Just let me know. If you want to be in this study, it will not change your relationship with your school.

When we are finished with this study we will write a report about what was learned. This report will not include your name or that you were in the study.

If you decide you want to be in this study, please print and sign your name.

I, _____, want to be in this research study.
(Print your name here)

(Sign your name here)

(Date)

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Printed Name of Person Obtaining Consent

Role on Study

APPENDIX J: Child Assent

Assent
UW - Milwaukee

IRB Protocol Number: 16.109

IRB Approval date: 10/21/2015

Signature of Person Obtaining Consent

Date

APPENDIX K: IRB Approval Letter



Department of University Safety & Assurances

New Study - Notice of IRB Exempt Status

Date: October 21, 2015

To: Latish Reed, PhD
Dept: Administrative Leadership

Cc: Michael Flanagan

IRB#: 16.115

Title: The effects of a one-to-one iPad initiative: A case study

Melissa Spadanuda
IRB Manager
Institutional Review Board
Engelmann 270
P. O. Box 413
Milwaukee, WI 53201-0413
(414) 229-3173 *phone*
(414) 229-6729 *fax*

<http://www.irb.uwm.edu>
spadanud@uwm.edu

After review of your research protocol by the University of Wisconsin – Milwaukee Institutional Review Board, your protocol has been granted Exempt Status under **Category 1** as governed by 45 CFR 46.101(b).

This protocol has been approved as exempt for three years and IRB approval will expire on **October 20, 2018**. If you plan to continue any research related activities (e.g., enrollment of subjects, study interventions, data analysis, etc.) past the date of IRB expiration, please respond to the IRB's status request that will be sent by email approximately two weeks before the expiration date. If the study is closed or completed before the IRB expiration date, you may notify the IRB by sending an email to irbinfo@uwm.edu with the study number and the status, so we can keep our study records accurate.

Any proposed changes to the protocol must be reviewed by the IRB before implementation, unless the change is specifically necessary to eliminate apparent immediate hazards to the subjects. The principal investigator is responsible for adhering to the policies and guidelines set forth by the UWM IRB, maintaining proper documentation of study records and promptly reporting to the IRB any adverse events which require reporting. The principal investigator is also responsible for ensuring that all study staff receive appropriate training in the ethical guidelines of conducting human subjects research.

As Principal Investigator, it is also your responsibility to adhere to UWM and UW System Policies, and any applicable state and federal laws governing activities which are independent of IRB review/approval (e.g., [FERPA](#), [Radiation Safety](#), [UWM Data Security](#), [UW System policy on Prizes, Awards and Gifts](#), state gambling laws, etc.). When conducting research at institutions outside of UWM, be sure to obtain permission and/or approval as required by their policies.

Contact the IRB office if you have any further questions. Thank you for your cooperation and best wishes for a successful project

Respectfully,

A handwritten signature in dark ink that reads "Melissa C. Spadanuda".

Melissa C. Spadanuda
IRB Manager



Department of University Safety & Assurances

Melissa Spadanuda
IRB Manager
Institutional Review Board
 Engelmann 270
 P. O. Box 413
 Milwaukee, WI 53201-041
 (414) 229-3173 *phone*
 (414) 229-6729 *fax*

<http://www.irb.uwm.edu>
spadanud@uwm.edu

Modification/Amendment Notice of IRB Exempt Status

Date: December 7, 2015

To: Latish Reed, PhD

Dept: Administrative Leadership

Cc: Michael Flanagan

IRB#: 16.115

Title: The effects of a one-to-one iPad initiative: A case study

After review of your proposed changes to the research protocol by the University of Wisconsin – Milwaukee Institutional Review Board, your protocol still meets the criteria for Exempt Status under **Category 1** as governed by 45 CFR 46.101 subpart b, and your protocol has received modification/amendment approval for:

- Increase in enrollment

This protocol has been approved as exempt for three years and IRB approval will expire on **October 20, 2018**. If you plan to continue any research related activities (e.g., enrollment of subjects, study interventions, data analysis, etc.) past the date of IRB expiration, please respond to the IRB's status request that will be sent by email approximately two weeks before the expiration date. If the study is closed or completed before the IRB expiration date, you may notify the IRB by sending an email to irbinfo@uwm.edu with the study number and the status, so we can keep our study records accurate.

Any proposed changes to the protocol must be reviewed by the IRB before implementation, unless the change is specifically necessary to eliminate apparent immediate hazards to the subjects. The principal investigator is responsible for adhering to the policies and guidelines set forth by the UWM IRB, maintaining proper documentation of study records and promptly reporting to the IRB any adverse events which require reporting. The principal investigator is also responsible for ensuring that all study staff receive appropriate training in the ethical guidelines of conducting human subjects research.

As Principal Investigator, it is also your responsibility to adhere to UWM and UW System Policies, and any applicable state and federal laws governing activities which are independent of IRB review/approval (e.g., [FERPA](#), [Radiation Safety](#), [UWM Data Security](#), [UW System policy on Prizes, Awards and Gifts](#), state gambling laws, etc.). When conducting research at institutions outside of UWM, be sure to obtain permission and/or approval as required by their policies.

Contact the IRB office if you have any further questions. Thank you for your cooperation and best wishes for a successful project.

Respectfully,

Melissa C. Spadanuda
 IRB Manager

APPENDIX M: Parent Introduction Letter

November 2015

Dear Parent or Guardian,

My name is Mike Flanagan, and I am a candidate for the Doctorate Degree in Educational Administration at the University of Wisconsin-Milwaukee. As part of the requirements for the degree, I am to participate in an original research project and report the findings in a formal doctoral dissertation. Throughout the past decade that I have spent as an educator, I have always been interested in instructional technology. In particular, I have had a keen interest in the last few years on the integration of Apple's iPad in to the regular school environment.

Upon completion of my coursework last spring, I have since worked with a doctoral dissertation committee that has helped set the tenor of my study in a manner consistent with academic research. The title of my study is "The effects of a one-to-one iPad initiative: a case study". Primarily, I am interesting in the conditions under which a teacher takes up a new technology initiative, as well as the perceived impact on student learning.

(SCHOOL NAME REMOVED) has voluntarily agreed to serve as the research site at which I will conduct observations of classes, interviews of teachers and administrators, and ask students to participate in a confidential, short, online survey that asks questions regarding the perceived impact on learning.

As part of the process by which we respect human subjects, I need to collect consent from all parents in grades six through eight, as your students will be the ones I will observe in the natural classroom environment. Be assured that I will simply be observing how the students use the devices, and at no time will I engage the students in formal interviews or focus groups. Furthermore, student names will not be collected, and the data will simply report how they are using the devices. I have also attached a consent form that explains this procedure in more detail.

If you would kindly return the signed consent form in the event that you are willing to have your student observed, I can begin the process of research. I thank you in advance for your willingness to collaborate with me in this project, and I look forward to sharing the findings with your school community.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Flanagan", with a stylized flourish at the end.

Michael Flanagan

APPENDIX N: List of Codes

Parent Code	Child(ren) Codes
CATEGORY: BACKGROUND	
<i>Experience</i>	Experience, no experience, some Experience
<i>Comfort Level</i>	Uncomfortable / unaware of how to use tablets, comfortable with tablets
CATEGORY: IMPLEMENTATION	
<i>Initial Thoughts</i>	Positive, negative, indifferent, excited, scared
<i>Actions</i>	Learn independently, on own, explore, question, learn from others, professional development
CATEGORY: EFFECT ON TEACHING STRATEGIES	
<i>Positive Effect</i>	Routine, plan, access content, assignments altered, student-led, convenience, assessment
<i>No Effect</i>	No effect, minimal perceived effect, Teacher-led
<i>Conflicting Data</i>	(No Child Code)
<i>SAMR</i>	Substitution, Augmentation, Modification, Redefinition
CATEGORY: USES	
<i>Apps</i>	(Used category to determine frequency of apps)
<i>Uses</i>	Efficiency, Organization, Convenience, Create, Research, Coursework, Homework, Picture, Video, Reference, Games, Other (outlier), formative assessment, summative assessment
<i>Convenience</i>	Single device, lightweight, cloud Storage
<i>SAMR</i>	Substitution, Augmentation, Modification, Redefinition
CATEGORY: BENEFITS	
<i>Experience</i>	Experience, No experience, Some experience
<i>Efficiency</i>	Quick, More Content, Access
<i>Students</i>	Engaged, on-task, helpful, collaborative
<i>Future</i>	College, High School, Daily Life, Touchscreen
CATEGORY: CONCERNS	
<i>Experience</i>	Experience, No experience, some experience
<i>Distraction</i>	Distracted, off-task, games, overwhelming

APPENDIX N: List of Codes

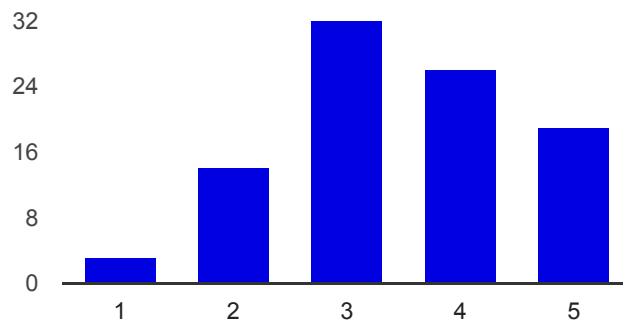
<i>Other Concerns</i>	Tech issue, professional development, Concern Outlier
CATEGORY: PERCEPTION OF EFFECTS ON STUDENT LEARNING	
<i>Effect</i>	(No Child Codes)
<i>No Effect</i>	(No Child Codes)
<i>Misconception</i>	Teacher misconception, student misconception, conflicting student teacher data
<i>SAMR</i>	Substitution, Augmentation, Modification, Redefinition

95 responses

[View all responses](#)[Publish analytics](#)

Summary

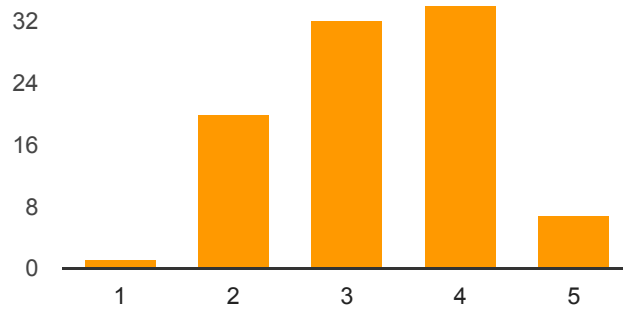
How well does your iPad help you to learn in class?



not well at all: 1	3	3.2%
2	14	14.9%
3	32	34%
4	26	27.7%
extremely well: 5	19	20.2%

How well does using your iPad help you to participate in class?

APPENDIX O: Student Survey Results



What apps do you most frequently use?

IXL

safari or a calculator app

Google docs, Google slides, Safari, Online textbooks, and
tecaherease

Ixl and Teacherease.

google drive, google docs

Chrome, Google Docs, Google classroom, and google drive.

Google drive, IXL, teacherease

Google Docs and Google Drive

google docs, google slides, google chrome, on line texts books, and
teacherease.

Google Chrome

Safari is my most frequently used app

Drive, Docs, Safari, and IXL

Google docs, google classroom, safari, and ixl.

- Mail - Safari - Math IXL - Google Docs - Google Search - Google
Classroom

Mail, Safari, CNN, Google Drive

Google drive, kindle, calculator, quizlet

Docs

Calculator -and teacher ease

Quizup,IXL,Chrome

APPENDIX O: Student Survey Results

I most frequently use google docs and safari. Also I use IXL and prezi.
i use myhrw.com (my math book) the most out of all of my apps. Then
i would use google docs.

Quizlet, Google Slides, Google Docs and Youtube.

my math app witch is IXL or my other math app (in forgot the name).
up doodle buddy for science and sometimes for other classes like
computers or library

QuizUp, ixl

Quiz up, Google, v3 calculator, Ixl

Chrome, Youtube and Star Chart

google,quizup,my.hrw.com,ixl

IXL, my.hrw.com,calculator, quizlet, docs, teacher ease,and notes to
keep info.

wattpad, gmail, docs, safari, camera, photos, IXL, my.hrw.com, app
store, app catalog.

ixl, garage band, google drive, mail

Google

Quizlet.

IXL, Safari for math

QuizUp And IXL.

Quizup and IXL

I have a chromebook from the highschool, but if I use my ipad. I
usually use Safari or google drive.

The google apps, but they are not very useful as my Chromebook
works much better for use of google products.

Google drive, google docs, mail, Safari

google drive, safari, google presentation

Ixl, teacherease, docs, drive, gme

Google slides, docs,sheets Prezi

all the google apps

Docs, Safari, and kindle.

Google docs, gmail, google chrome, quizlet, Google classroom, IXL,
Desmos graphing calculator, and CNN.

APPENDIX O: Student Survey Results

Google Docs, Gmail, IXL.

google docs and safari

google

Google documents Google classroom Gmail Google slides Calculator

Google chrome Teacher ease Spotify

Google Docs, IXL, and safari

Netflix Google Docs Doge IXL

I use the google apps the most, but I don't really like to use it since it is slow. If I can I will use a computer.

I use Google Docs or Google Drive.

I use almost all of the Google apps all of the time, and I use the Google Docs a lot, and I also use IXL, and a homework app called Sticky for my homework.

-Google Documents -Google Classroom -Google Slides -Calculator - Safari -Google Chrome -Gmail -TeacherEase -IXL -Pandora

google, google docs, google sheets, google slides, Prezi, chrome, quizlet

my math book online, IXL

quizlet, ixl , math book online

Quizlet, IXL, my.hrw.com, safari, google docs, google slides.....

IXL, hrw, prezzi, teacher ease and quiz up

IXL HRW Google Docs Google Slides Quiz up Teachers ease Mail

google docs google sheets google slides IXL math book

safari IXL PAPER 53 QUIZUP, CALCULATOR, GOOGLE APPS, AND EXOPLANET

i most frequently use on my ipad the myhwr.com which is the math online textbook that i use for math and i use IXL for math practice and i use google docs, prezzi, quizup, and quizlet.

google docs, IXL, Holt Hcdougal Online, Teacher Ease

Google Chrome and docs, IXL, teacherease, Quizup, safari, email, and calculators.

I use google docs and the internet on my Ipad.

I use google docs,and google slides,and I use an app called

APPENDIX O: Student Survey Results

"Duolingo" for learn English

I frequently use Quizlet, Ixl, myhrw.com and google docs.

Safari, IXL, Quizup, Quizlet, Doodle Buddy, Chrome, and Google Docs

ixl, cow evolution 123d sculpt, wattpad

Calculator, Photos, TeacherEase, Safari

Doge 2048 Smashy Road

Google docs Google slides Gmail

Google docs, drive, slides, etc.

Doge 2048, Netflix, and Fantasy Basketball

I use the Google Drive, Safari, and E-mail app the most.

Safari

Google chrome, safari, and camera

Google docs, and google mail

Any apps that run on google. I also use the safari, prezi, and quizlet.

Lu Wavelab and docs

Google docs and safari.

IXL, Gmail, Safari

Google Docs, Photos/Camera, Google Chrome, Notes, and Calendar

Google docs, slides, gmail.

ixl and google

YouTube, Safari, LU Wave Labs, IXL

Google Docs, Safari, Earth Viewer

i tend to use apps by google like hangouts, gmail, google, docs, etc.

etc. but those arent the only apps i use i also use wattpad(a reading website)and musiv and youtube. i have to confess in my free time i do play quizzes and other gmes.

YouTube, QuizUp, Calculator, Docs, Safari.

Google classroom, gmail, Teacher ease, Docs, and my online textbooks.

I most often use Google Classroom, Docs, Drive, and Slides. I also use Gmail a lot.

I use google docs and safari the most

I frequently use docs, slides, Safari and Gmail.

APPENDIX O: Student Survey Results

How do you use these apps?

At least once a day

I use them for homework

I use Ixl to practice math and teacherease to check my grades.

school work

I use Chrome as a search engine, and I use the others for homework and projects.

To do class work, and to check grades.

For homework assignments and some projects

i use it for homework.

Textbooks and research

To access online textbooks

For school work like writing papers and doing math quizzes on ILX

For writing papers and classwork.

- Homework - Research - Teacherease - Textbooks - Math Homework

- Science Homework

Checking email, searching things online, checking the news, writing papers.

to study, read, and do homework

assignments

To check my grades and math

to learn and pass time

I use google docs to write papers for different classes and I use IXL for math lessons. Also. I use prezzi for my current science project.

i use docs for every subject and i use myhrw.com only in math class.

I use quizlet to study for the vocab quizzes that we had in language arts I use Slides and Docs for projects youtube to learn something

for math, science almost all

ixl for homework and QuizUp for fun

Some for fun, some for homework.

Chrome to look stuff up. Youtube to watch videos on how to do

APPENDIX O: Student Survey Results

something. Star Chart to mess around and look at stars and planets.
google= for looking stuff up quizup= playing quizup my.hrw.com= its
our math textbook ixl= for doing ixl homework
for homework and keep important info for the i pad like passwords and
stuff.
reading, mail, typing, searching, picture, pictures, math, math, apps,
apps.
learning and helpin me and other people
I research certain topics
For school purposes.
I do my homework for Math
For math homework, and for games.
Quizup is a game, and IXL is used for math homework it helps us
understand our homework.
Homework and research.
Mostly just for looking at assignments.
For homework or glass work
school work
How they are supposed to be used
presentations
for projects and presentations
To read, online textbooks, and write papers.
Mostly for homework, studying, searching of information, and tools for
certain classes.
To complete homework.
to write class assignments and look up things for school
for our school sites and for small random questions
For homework, keeping up with grades, and spotify
Writing papers and doing math homework
Entertainment and homework
For school homework or other things.
sometimes my computer a home does not work. I also use them to get
homework done faster because it is easier to type then to wrote on

APPENDIX O: Student Survey Results

paper.

I use Google Docs for notes, scripts, papers, and a whole bunch of more things.

I use these for homework, keeping up with announcements/ teachers and mail, and for everyday use (Music, Calculator, Safari).

Presentations, and the internet, learning definitions

i use my math book to learn math and to do math lessons, and i use IXL for other math lessons.

I use my math book for homework.

Quizlet= Helps me learn the definition in a word if we are going to do a test
IXL= I do my homework on it. my.hrw.com= Has my math book on it. Safari= Helps me look things up. google docs/slides= I use it for doing my presentation and writing assignments.

They help me with presentations and research

For homework and projects

For homework and school projects

FOR ENTERTAINMENT, AND SCHOOLWORK

i use myhwr.com and IXL for math homework and the i use google docs for writing a paper for class. i use prezzi for creating slide shows for classes and projects also. i use quizup during free time when were allowed to play on our ipad where you can challenge your friends in a playful competition game online and take a break from school work. i use quizlet to make flashcards and whe your teacher makes flashcards she can post them on quizlet and let their students use it to study. also you can post things if you have an account and let your friends study from that.

For schoolwork. To find out what I have to do on teacher ease then work on it with the other apps

I use Chrome and safari to find google images and websites for school projects and access my online math textbook. I use docs for school papers and IXL for assigned homework. I use teacherease to check my grades and Quizup to challenge my friends in different topics. I also use different calculator apps for homework and mail to check any emails.

APPENDIX O: Student Survey Results

Writing stuff and looking stuff up.

to learn English, and complete homework

I use Ixl for math homework and assignment. I use myhrw.com for math problems and questions. I use google docs for papers in science, language arts and social studies. I use Quizlet for games.

I use Safari and Chrome to find pictures and websites for projects. I use Quizlet to study for tests. I use Doodle Buddy to write notes when we play games in class. I use IXL and Google Docs to do assigned homework. I use Quizup to quiz my friends on many topics.

ixl: math cow evo.: entertainment 123d sculpt: 3d design wattpad: reading/writing.

For homework, Grades

To play games

I use them to work on my assignments that are given to me by my teachers.

To work on homework.

When I am bored in a study hall

Google Drive lets me access the documents that my teacher's share with me for class and the ones that I have created easily. The Safari app lets me access the internet and I use it to look up things when I have questions about homework. The E-mail app lets me read e-mails and announcements that my teachers have sent me.

Searching

Doing homeworks

to check my mail and type for presentations

For math

I use most of them create a doc or a presentation. I use quizlet to help me study for tests and quizzes.

i use them for work and entertainment.

For working on big projects and looking up information.

Ixl-math, Gmail-to check mail, Safari-research

I use these apps to take notes, do homework, search the web, take pictures, and use my calendar for events and due dates.

APPENDIX O: Student Survey Results

I use them for book reports, check email, homework.

math and other stuff

Watch entertainment, homework, confuse my mind, do boring stuff

For work and D&D maps

i use them for educational and recreational uses.

Sometimes I use YouTube and QuizUp for fun, but I use the other three for school.

I check for homework, check my scores, and do homework.

I use IXL for math homework

I use these apps to keep in touch with teachers and edit documents.

I use them for school work and research.

I use them to finish school work during the day and at home.

What are the most constructive uses of your iPad?

online textbooks

I can use it for homework

Being able to type up papers on google docs.

online text books

Homework and Schoolwork.

To be able to do math and type things

Google docs and Google drive

being able to access on line text books and homework.

Math usage such as IXL, textbook for homework

As a Textbook

organizing the homework that I have to. Being able to have access to my email, docs, and google drive.

I use mainly for classwork not as much as home. It useful to have it in class for working on papers or projects. Some things are easier on the iPad but I prefer using a computer at home.

- iPads give us access to our Google Docs anytime - Because we have Math IXL every week its easier to get it done w/ iPads -

Accessing Math and Science textbooks

APPENDIX O: Student Survey Results

Doing stuff online such as writing a paper.

Homework

docs

you get to learn stuff that you might not be able to learn with a book

IXL for math use

Being able to go on the internet and having the ability to check you grades on TeacherEase.

being able to have some of my textbooks on my ipad which makes my backpack much lighter.

Learning

computers, library, math, science mainly math but almost all

ixl and studying

Calculator, Ixl, my.hwr.com, teacherease, Quiz up

Learning how to do stuff.

my.hrw.com for math, google when we have to look stuff up for school, ixl for homework and quiz up play educational games.

We always use them in math and sometimes use them in other subjects.

math, because now i don't have to cary around a huge book, i can just use my lpad, and i can get emails from ms vizak on it to.

Being able to use the ipad on the go.

It helps me get information faster.

To practice flashcards and to research things.

the google and safari

For Math Homework.

Math homework

Academics.

Homework and classroom activities

I use it for school work

They help me get thing in

Reminders, email, teacherease, docs, Safari.

Homework!!! It also helps me with online studying, which constructs my use of tools given to me by teachers.

APPENDIX O: Student Survey Results

To work on documents in class, view grades, finish homework.

using it for school

there aren't that many constructive uses

Homework Music Checking grades

Using the internet

Schoolwork

Homework assignments that can be done on it.

the google docs on my iPad.

I use it to do presentations, and a lot of scripts, and everything with technology and Google.

I think the iPad helps with in class work because you can type things, look at a slide for notes, and for helping with basic school work.

Math, presentations,

quizlet, math book, ixl

quizlet, ixl, math book online

Having the IXL and my.hrw.com it helps me because i dont need to carry around a big text book.

Homework

the math book google docs

MY MATH, AND SCIENCE WORK

instead of using your ipad to watch youtue videos for fun you can use youtube to learn how to do something.

using IXL, Math homework

Mostly for homework so I don't have to carry a big math textbook in my backpack. It's also helpful so I don't have to wait to get home to go on my big iMac, I can just go on my iPad mini for IXL, projects, teacherease and calculators.

google docs and prez

Google docs and prez

Homework on ixl and myhwr.com in math. Goggle docs for papers.

Doing my homework. My iPad is very helpful because i don't have to carry a bunch of books home.

ixl, wattpad

APPENDIX O: Student Survey Results

TeacherEase to see missing work

Writing Papers

I think that it is good that not every one has to be on a computer to work on their assignments.

Using the iPad to share things with project partners, such as documents and presentations.

Google Classroom

I use my iPad the most for Google Drive because the teachers share a lot of documents with us for classwork and homework.

Safari

doing homework, taking notes.

Google apps

Not IXL

The most constructive use for my iPad is that I could create any presentation, doc, or study.

to help me learn and have fun in school.

Google docs and safari and it is easier to carry around.

Math/Science homework

Doing homework, taking notes, using my calendar app for due dates, and taking pictures of the white board.

Google docs, slides, google classroom.

not ixl

YouTube

Earth viewer and Google Docs

some more constructive uses that I use my iPad for are killing time, math, science, social studies, and language arts. it comes in handy to write reports and do homework on.

I use it to check for homework and type stuff.

It helps me get updates and do my homework.

IXL

In my opinion it is using different apps to create something interesting.

Most constructive use is being able to use them throughout the school day instead of using a computer.

APPENDIX O: Student Survey Results

What are you able to do with your iPad that you are unable to do without it?

not have to carry 3-4 textbooks

Go on teacherease, go on google docs and google slides.

Take pictures of assignments

go to online text books

I'm able to use apps with a device in class.

I am able to do google docs, and IXL, but I am not able to go to a blot of interactive websites because they need certain flash players.

I'm able to do other assignments but I can't do assignments online or without an app

I can use it for teacherease, google docs, and google chrome, if I didn't have my ipad I wouldn't be able to access teacherease, google docs, and google chrome.

Access the proper textbooks, IXL homework

Nothing that I can think of

IXL is easier and also contacting my teachers for help that I might need

I can work on papers in class and use online textbooks.

- Check Teacherease anytime during the day - Research the internet anytime

Write papers online, check email, etc.

Read kindle, study for quizzes

nothing

Go on the Internet and use apps

pass time

Go on the internet and do different projects.

use Imovie

Check my grades

i dont know if eel like its just eaiser with the i psd though.

Use it for online textbooks and you carry around all of your textbooks and its much lighter

Im able to google things, and i don't have to look at a book, and i can

APPENDIX O: Student Survey Results

talk to friends over quiz up, And without it I cant do anything.

A lot of projects

look up stuff on google and talk with friends from many places

Email the teachers if i need to ask questions,IXL This dosent have to do with this one but i didnt know what one to put it in. The i pads help soone we dont loose as many books.

IXL, witch is a math website i can only do on my ipad.

Be able to carry a mini computer anywhere so you can use it on the road.

I can't always log on to a computer all the time to do research.

Do my math homework on the online textbook.

bad

Do Homework.

Do IXL, (homework)

Not really anything because I have a Chromebook and it does everything much better than the iPad so I hardly ever use my iPad, it is actually dead most of the time.

Access teacher ease easily as well as Google docs and other apps used for homework

I would not be able to use it to connect to the internet

Everything

Homework (math)

homework

I can check assignments when I am sick, it's easier to finish homework that has to be typed, and I can look something up if I don't understand it.

Search Google, type reports, watch Kahn academy videos, use an online textbook, and have access to teachers, though email.

Type during class, do IXL in school, view grades in class, share documents with teachers in class.

type on it for documents and use the internet

it's just an accessibility that is easy to use when you need it quick

Nothing really, When I'm NOT at school I use my computer.

APPENDIX O: Student Survey Results

Use the internet

Watch Netflix, do IXL, reach online textbook, entertain myself during boring classes

Work in a classroom on a device at pretty much anytime.

an iPad helps do things more efficiently. You can do everything off an iPad but it is faster to use an iPad

Everything...

I am able to use it for basic school work. I personally think that a Google Chrome Book would be a little more helpful with: typing, going on the internet, homework, and projects. I like the iPads also because it is easier to carry around.

math, quizlet, IXL

homework and ixl

homework ixl

Go on IXL, my math book, Safari....

If I did not have an Ipad it would be much harder to work on homework and projects in CLASS.

Some Homework

IXL

USE MY MATHBOOK FASTER

IXL homework that you can also get extra practice and if you dont get your assignment or lesson you can watch a video how to relearn the lesson.

IXL, Holt Hcdougal math

I am unable to use school apps when the computers are all being used which happens very often.

IXL and internet

IXL and Internet

I would not be able to get homework by myself and the teacher would have to hand out a sheet of paper. I can take pictures of my assignments.

I am able to do homework on it that I would normally have to do on a computer but sometimes I don't have access to a computer

APPENDIX O: Student Survey Results

easy share math work with my teacher, be able to learn about 3d design, read tons of books that other people made for free, and publish books that make.

Taking pictures of math homework,looking for grades.

Type papers without a computer

We are able to all work at once without having to take turns for using the computer.

Edit presentations and documents, and work on things with partners when you are in a different place than them. Also, typing assignments instead of handwriting them.

Learn

I usually use my Chromebook from the high school because I find it easier to type on and edit documents on, but I like my iPad because it is smaller and easier to bring to each class. I can also use apps like iMovie on it which is helpful because we have to create videos for class sometimes.

Safari

Taking pictures.

Nothing

IXL

I could basically do anything that's on my iPad on a computer or chromebook.

use docs and work on online folders.

Doing homework faster, taking pictures, IXL(sometimes), and reading.

nothing, I have a laptop at home. I can do all the same things.

Taking pictures of notes the teacher wrote on the board and getting notifications for events in my calendar.

Playing quizup is the only thing because I have a computer and I can do everything on my computer.

everything

Watch vids, play games

Google stuff without a computer

i can take pictures of the assignment board??????????

APPENDIX O: Student Survey Results

I wouldn't be able to write papers during study halls without it. And play QuizUp with friends. (I rek them in Disney Princesses.)

Check class updates at any time, carry heavy books around, wait until i'm at a computer, and wait until the teachers hand homework back.

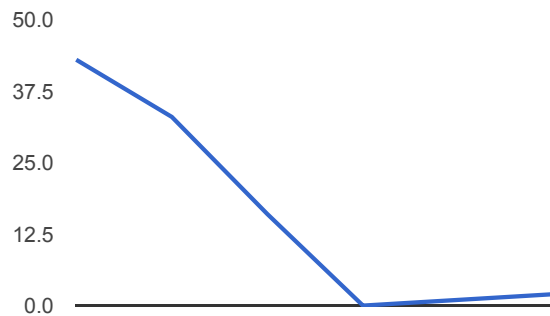
know the apple id

With my iPad I access files during clas work time. I find this extremely important, because I can ask questions and get my assignments done in class.

To be honest iPads are not necessary but the can sometimes be useful.

I am able to work on any type of homework without worrying is a computer open, it allows me to work more frequently throughout the day.

Number of daily responses



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Dissertation Title: THE EFFECTS OF A ONE-TO-ONE IPAD INITIATIVE: A CASE STUDY.