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The Effects Of Technology On Student Motivation And Engagement In Classroom-Based Learning

James Francis
University of New England

THE EFFECTS OF TECHNOLOGY ON STUDENT MOTIVATION AND ENGAGEMENT IN CLASSROOM-BASED LEARNING

By

James Francis

B.A. University of Connecticut 2008
M.S. Ed University of New England 2013

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Abstract

Technology has seen a recent widespread integration into daily life, where access to vast amounts of information is now available with ease. Today's generation of students has grown up with technology all around them in an ever-increasing manner. To create an effective 21st century classroom that meets the needs of the students, a modern teacher must factor a student's motivation to learn and the effects technology has on inclusionary education.

A technology implementation was devised to address this rising need. Research was completed at an urban charter school on a population of 348 at the time of technology intervention through data analysis. Student surveys were administered to gauge student perception and motivation, student individualized education plans were reviewed, and classroom observations were made.

The results showed that students feel motivated through the specific use of technology in the classroom, whether it be for pedagogical purposes or for accommodations as required by an Individual Education Plan (IEP) or 504 plan. Further study can aid in updating teaching techniques to better support inclusionary education as well as enhancing student motivation.

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This dissertation was presented
by

James Francis

It was presented on
May 12, 2017
and approved by:

Michelle Collay, Ph.D., Lead Advisor
University of New England

Erin Connor, Ph.D., Secondary Advisor
University of New England

Sanela Jonuz, M. Ed., Affiliate Committee Member
Salem State University

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CHAPTER 1

INTRODUCTION

The students of today are surrounded by technology, where access to a vast collection of information is only a fingertip away (Egbert, 2009). Many in the field of pedagogy state that technology integration is helpful, meaningful, and necessary for a school to function successfully. However, many teachers are reluctant to make the change, and many students are not motivated to try. In 2013, a survey was given to the Chicago Public Schools by Ehrlich, Sporte, Sebring, & the Consortium on Chicago Schools (2013). It was found that 92% of students had some form of technology and internet access in their home, but fewer than half of the students used that technology for work related to school.

In the modern information era, the wealth of the world's information can be accessed through a variety of devices. Technology that was once expensive and limited to only the privileged few has now advanced and become far cheaper (Edwards, 2009). Students have grown up with technology all around them, and teachers must adapt to this new lifestyle.

Teachers adapting to this new lifestyle must find methods of incorporating and utilizing these new forms of technology in class, not only in a motivational level, but also on an instructional level too. This can be done in many different ways, from a *ground up* pedagogical method to the use of accommodations on an Individual Education Plan (IEP) or a 504 plan. Students who find themselves supported and taught in a method of which they are used to will be more motivated to learn and feel included.

In today's emerging technological society, it stands to reason that the modern day classroom should reflect what is seen in society. By showing real world technological

applications, intrinsic value can be brought to the learning process, increasing interest and motivation (Usher & Center on Education, 2012).

It is also important for these classrooms to address the need of all students. Technology supports the need for divergent learning approaches, helping to create a sense of community as well as a meaningful experience (Futurelab, 2009). Appropriate use of technology can serve the regular education classroom by motivating students in all disciplines, such as math, social studies, and literacy (Heafner, 2004; Liu, 2016; Housand & Housand, 2012). Students who have identified learning disabilities can be served by the appropriate integration of technology through assistive technology devices, allowing students to access the information and maintain pace with a regular education classroom (Floyd and Judge, 2012).

Statement of the Problem

Today's generation of students learn differently than those of the past. Technology is all around them, and access to a wealth of information is only a click away. Ehrlich, Sporte, Sebring, and the Consortium on Chicago Schools (2013) found that 92% of students had technology in the home, but less than half used it for school work. Pedagogy must change with the times. When teachers continue to teach topics and skills that students may deem outdated and not applicable in the real world, students may lose motivation and interest as the intrinsic value of what was learned is lost (Usher & Center on Education, 2012). By integrating technology into education, teachers will be able to motivate and include the entire spectrum of students (from learning disabled to gifted and talented).

The topic of technology in the classroom to assist with academic success has been studied, albeit not as extensively as other academic areas. However, the deficiency of available

technology lies with assistive technology for students with high incidence disabilities. Flanagan, Bouck, and Richardson (2013) noted that the technology was effective, but the cost was prohibitive. It was also noted by Bouck and Richardson (2013) that the body of literature was lacking in the subject of assistive technology and its implementation.

In order to maintain anonymity for the students and to adhere to the Instructional Review Board (IRB) exemption that was granted on January 29th, 2016, the school name and location will be withheld. The school where data was taken from is a charter school in an urban environment in New England. I will refer to this school throughout the dissertation as NECS (or New England Charter School). The mission NECS is to prepare students for the rigors and pressures of today's society who may have little to no resources. Previously, at NECS, a similar finding to Erlich, Sporte, Sebring, & the Consortium on Chicago Schools (2013), was identified, where technology was not utilized effectively. This, in turn, led to a problem of missing "from the ground up" or constructivist instructional practices. Through the course of this dissertation, and at the approval of the administration at NECS, I began a process of identifying and observing the overhaul of their technology plan with the understanding of creating a more motivated, more inclusive learning environment.

Purpose of the Study

The use of technology in the classroom has the benefit of increasing academic achievement from the perspective of both the students and the educators (Courville, 2011). In a study by Usher & Center on Education (2012), real-world applications of technology along with other academic subjects helps motivate students. They found that when technology-based inquiry-learning correlates to real-world situations, students begin to see the intrinsic value of

what is being learned, which increases interest and motivation by the student. In addition, by applying abstract ideas into real-world situations, students can understand complex concepts, which will then increase competence. By adding technology into the classroom, teachers can utilize this technology to differentiate instruction, motivate students, and include all skill levels.

The purpose of this study was to: 1) find out students' perceptions of the use of technology in their classroom-based instruction; and 2) to describe current use of general technology and assistive technology in classrooms that include identified students (those with documented learning disabilities).

With any research, the best research is conducted by identifying the difficulties and problems of the study early on and accommodating or eliminating them. The purpose of this study is to not only understand the need and importance for technology in the classrooms on its relation to motivation and inclusion, but to encourage the creation of a ground up curriculum design at NECS based on observations of instruction using technology.

Findings from the study will inform a wide variety of audiences. The primary audiences for such a study will be local Boards of Education (for any district curriculum implementation plans), local school administration (for the operation of schools impacted by such a curriculum plan), and teachers (who provide implementation). Each of these groups of people would stand to benefit from the research presented herein by aligning curriculum with STEM technology and 21st century pedagogical techniques that are effective.

Significance

The significance of the study is to add to the body of research surrounding the effects technology has on motivation and inclusion. Research was conducted concerning how students

currently experience the use of technology at school through classroom technology use and technological accommodations as provided on an IEP or 504 plan. These findings can go on to inform a variety of audiences, from Boards of Education down to the actual teachers who provide technology implementation.

Research Questions

Overall, the main research question that guided this dissertation is: How do present-day educators utilize technology to engage students in learning activities? Related questions that were also examined are:

1. Do students report technology use in the regular education classroom being used to accommodate all levels of students? If so, do they feel that more or less technology is needed or necessary?
2. How is technology used to enhance instruction for identified students (students using an Individualized Education Plan [IEP] or 504 accommodation plan)?
3. What is the current state of assistive technology at this site and how is it used to engage identified students in learning activities?

Conceptual Framework

Technology is ubiquitous in the real world and educational settings lag behind the needs and expectations of the students. It is through this lens that the initial diagnosis of the status of NECS and its technology implementation occurred in 2012. As a part of my Master's Degree thesis completed at the University of New England, I examined the effect of having SMART Board technology in the classroom and its effect on student test scores (Francis, 2013). The analysis was completed in my own classroom using testing scores of a specific, unchanged test

over the course of three years. The result showed a statistically significant increase of grades after the installation. My action research project showed similar results to other studies (like Heafner's 2004 study) in that students showed a marked increase in motivation when more technology was introduced.

One of the key findings in the literature on technology implementation is the power of technology to engage students in relevant learning, in that the use of technology increases student motivation and engagement (Godzicki, Godzicki, Krofel, & Michaels, 2013). Some studies suggest students who are provided technology are more motivated learners, such as in Halat's (2013) study involving the use of Webquests, which is examined in more detail in the literature review. When learners are actors engaged in their own learning, they are more likely to make meaning and construct their own understanding of complex ideas (Futurelab, 2009). Technology, used appropriately, can support constructivist approaches to teaching and learning.

Constructivism

The theory of constructivism put forth by Jean Piaget asserts that a child who actively experiments in activities forms more active connections and is better able to "inter-coordinate" or integrate their experiences into their daily lives (Piaget, 1955). As technology becomes more and more integrated with daily life, educators must take a modern view on the utilization of technology to support inter-connected learning. This modern view holds that technology gives the learner flexibility and the ability to be adaptable in multiple scenarios and within different subject areas. Technology can be used within many pedagogical approaches (Ford & Lott, 2011). Though integrating technology difficult and intimidating, the modern teacher who embraces the

concept of change will find that the very thing (technology) that may be intimidating will open many opportunities for learners that would not otherwise be accessible (Ford & Lott, 2011).

In current pedagogical practice, those who agree with Piaget's assertions believe the profound nature of learning comes more from active participation than passive participation (Ebert, 2015). This can come in a variety of forms, from hands-on activities to authentic and practical real world scenarios (Gensburg & Herman, 2009). Ebert (2015) also states that "…real-world Constructivist learning situations are more motivating to students through practical application of knowledge" (n.p.).

It is also important to note that constructivism actively supports the notion of differentiation, or active support that allows all levels of learners to fully participate. A teacher who employs these techniques will also plan a curriculum that best suits the needs of the learners, from materials to proper pacing (Gensburg & Herman, 2009). Teachers plan learning activities that allow students to individually approach learning goals in their own way and in their own time, also known as differentiation. Through differentiation, students are then able to construct knowledge and make meaning to the information being presented. Through a technology-centered curriculum, teachers can utilize technology to differentiate and accommodate classroom environments to allow students to learn. Technology, used appropriately, supports constructivist learning and provides different avenues for students with or without documented learning disabilities to learn.

Background of the Study

The students of today are surrounded by technology, where access to information is only a fingertip away. It has been said that technology integration is helpful, meaningful, and

necessary for a school to function successfully. However, many teachers are reluctant to make the changes that incorporate technology into their instruction, and many students have not experienced effective technology integration in classroom instruction.

The use of technology and technology-supported learning environments will aid in increasing student engagement and motivation. A technology-rich curriculum was implemented for students from grades 7-12 in a New England Charter School in an urban location, from students at all levels of achievement (from learning disabled, to average, to gifted students) in the core disciplines (Math, Science, ELA, and Social Studies) and in some non-core classes (such as AP Courses, Astronomy, Chorus, and Guitar).

By implementing Google Technology (Google Drive, Google Docs) and other kinds of technology (SMART Boards, clicker based response systems, database grade storage systems) in standard and non-standard pedagogical methods at NECS, teachers can increase the academic motivation among unenthusiastic students when implemented correctly. This study focused on students' perceptions of technology at school and documented some examples of how teachers are currently integrating technology in classrooms.

There are several stages that were addressed through this research study. First was identifying the topic of study. In this case, the topic was technology in education as it relates to providing appropriate technology and its role in creating an inclusive learning environment. Next, data was collected. For this research study, three data sources were utilized: a student survey about feelings of motivation and inclusiveness, accommodation data from individualized education plans and 504 plans, and two administrative observations. Student surveys were given

to students during the 2015-2016 school year. The other documentation was evaluated during the 2016-2017 school year.

Definitions

For the specific use in this study, the following key terms are defined:

- *504 Plan* – provides students with accommodations as outlined by Section 504 of the Rehabilitation Act of 1973 in order to prevent discrimination. Is often just referred to as just 504 (U.S. Department of Justice, 2009).
- *ClassMate Reader* – a type of assistive technology device utilized with students who have a learning disability for the purposes of reading (Floyd and Judge, 2012).
- *CPU* – acronym for Central Processing Unit (Koshino, Kojima, & Kanedera, 2013).
- *E-Learning* – shortened version of electronic learning, or learning via an electronic device (Sung Youl Park, 2009).
- *IEP* – acronym for Individualized Educational Plan
- *NECS* – acronym for New England Charter School, which will replace the actual name for the source location to protect individuals.
- *SEA* – acronym for State Educational Agencies (Gross, Jochim, Nafziger, & Edvance Research, 2013).
- *Technology Integration Matrix* – A spreadsheet that shows the process of technology integration in a given entity (Technology Integration Matrix, 2014).
- *TAM* – acronym for Technology Acceptance Model (Teo, Su Luan, & Sing (2008)
- *WebQuests* – specific type of lessons derived from the internet (Halat, 2013).

Conclusion

Chapter 1 introduced the study, its site location, defined key concepts, provided a rationale and purpose, and defined the research questions and purpose of the study.

In subsequent chapters, this study will address the research questions posed in Chapter 1. Chapter 2 (the Literature Review) details the concepts and findings that supported the development of the research questions. Chapter 3 (the Methodology) details the approach to the study based in the Literature Review and the purpose of the study. Chapter 4 (the Results) details the findings suggested by three types of data: survey, examination of how technology is used for identified students, and examples of the technology's use in sample classrooms at the site. Chapter 5 (Interpretations and Conclusions) details the findings based on the study and posits future action.

CHAPTER 2

REVIEW OF THE LITERATURE

Technology of all kinds has seen widespread integration to daily life, from cell phones with fingerprint scanners, to cars with integrated GPS navigation. It is only natural that the effects of technology on student life be studied from a teaching perspective. In order to understand how best to implement technology in the classroom, it is important to provide a baseline from which to study the influence, importance, and integration of technology to engage learners. Once the baseline is established, it can be compared to what is actually occurring in the classroom.

First, the current state of technology in education will be reviewed, along with its influence on daily life. Then, I review and address the use of technology and its effects on

motivation and inclusionary education. Finally, the conceptual framework that provides the basis of this research will be presented.

Current State of Educational Technology Implementation

The United States Department of Education analyzed teachers' use of technology in education in the public school systems (Gray and Lewis, 2010). Of the teachers surveyed, 97% were found to have one or more computers in the classroom, and 54% stated that they could and would bring computers into the classroom, though less than 40% utilized the technology 'often' and 29% 'sometimes'. Despite having open access to technology, only 69% of teachers utilized the technology at hand on a consistent basis (Gray and Lewis, 2010).

Researchers at the Research Centre for Vocational Education in Finland studied technology use from a pedagogical standpoint (Nokelainen, 2006). At that time of the study, it was found that technology and digital media used in pedagogy was not studied in depth and merited further study, though it was determined that technology could be used to support the teaching environment. Since that time, more research has been conducted, and will be presented throughout this chapter.

When examining state educational agencies (SEA), it was found that there is intense pressure by the government, state officials, and the citizens to close the achievement gap between high and low performing students. This so-called "new normal" means that SEAs must work with fewer resources than what they used to and must make greater progress in closing the achievement gap (Gross, Jochim, Nafziger, & Edvance Research, 2013). Educational agencies from the national and state level down to individual schools are expected to innovate instruction. School-based leaders are expected to set and maintain higher standards, but are unable to do so

for many reasons. Those reasons include a lack of comprehensive planning in setting students up for post-secondary schooling (Floyd and Judge, 2012), considerable variation in every school in planning and technology implementation (Chicago Schools, 2013), and a lack of funding (Gross, Jochim, Nafziger, & Edvance Research, 2013). To alleviate these problems, the Building State Capacity and Productivity Center (BSCPC) was created to help educators obtain funding.

As discussed previously, there is a lack of comprehensive planning and connection between K-12 students and future studies. This can be seen in Marshall's 2011 study, where the idea of technology was discussed as 'innovation' for teaching instruction in post-secondary schooling. The current college culture and existing infrastructure prohibits this innovation, which in turn prevents further innovation in pedagogy from taking place (Marshall, 2011). Without strong leadership in the highest echelons of power and a total paradigm shift, the current level of technology application and integration in the classroom will continue to be limited: it is difficult to maintain educator training and costs are high (Zavieri, 2014).

Perspectives on Use of Technology in Education

All students (from elementary through high school) need greater exposure to a plethora of technologies in the classroom, but many schools may not be meeting this need (Bolkan, 2012). Many students are found to have the capability to use technology, as well as the access to do so at home, and many of those utilize it for educational purposes (Erlich, Sporte, Sebring, & the Consortium on Chicago Schools, 2013). It was found that those in positions of authority at the schools are responsible for setting expectations for technology use. However, throughout all schools participating in the study, there was an inconsistency regarding how much technology is actually used for instruction. The variation in student and teacher use in the different schools is

directly related to the culture for technology integration. In the schools with a more positive culture towards technology integration, more students and teachers tended to utilize technology.

It is important for the future generation of teachers to learn how to teach in a manner that will best reach their students. Teacher training begins at the collegiate level. The number of colleges and universities using electronic learning (or e-learning) has been increasing, though there is a gap in the research pertaining to student adaptability (Sung Youl Park, 2009). Infrequent technology users were found to have difficulty in implementing technology for teaching, while frequent technology users felt accomplished in creating a technology supported environment (Meyer, Abrami, Wade, and Scherzer, 2011). This gap is then carried over into the K-12 schools where the future teachers will teach. As was seen in the study completed by Erlich, Sporte, Sebring, & the Consortium on Chicago Schools (2013), if the culture of technology integration is well in place for pre-service teachers, it will carry into the classroom.

Student Motivation Through Technology Use in School

A study by Godzicki, Godzicki, Krofel, & Michaels (2013) focused on the element of motivation amongst elementary and middle school students. They implemented a technology-supported learning environment and targeted certain problematic behaviors. Among these targeted behaviors were non-completion of homework, unpreparedness for class, and sleeping/putting their heads on their desks. The authors found that students were more likely to engage in an activity simply because technology is being used. However, almost 50 of surveyed teachers used technology for 80 or fewer minutes per day. After implementing a technological intervention, students stated that they felt teachers provided activities relevant to them, and

motivation and engagement went up 9% for all students (Godzicki, Godzicki, Krofel, & Michaels, 2013).

One method of technological intervention is that of the WebQuests, which are lessons where all of the information comes from the internet. In his study, Halat (2013) examined the viewpoint of students in 4th and 5th grade on the use of WebQuests in the classroom. The Webquests utilized for this study were compiled online through an editing software called FrontPage. After the student participants were introduced and given their own WebQuests to complete, the students were given a questionnaire. It was found that the students enjoyed the use of the WebQuests, and experienced increased motivation to learn.

Research suggests that the presence of embedded systems does not necessarily influence student motivation, but Koshino, Kojima, & Kanedera (2013) noted that finding was based on several factors. The most notable factor limiting use of the system is the slow CPU (central processing unit) performance. To solve this problem, researchers developed a new educational board titled E+ and introduced it to third grade students. After a one year observation, the students were polled to gauge their motivation levels. The authors found several of the problems presented by traditional education were overcome by E+, and students felt their understanding of the material increased.

In an earlier study, Heafner (2004) studied the effects of technology on student motivation in a social studies classroom. The students were in grades 9 and 10 who were learning World History, Economic, Legal, and Political Systems. In this study, students were required to make a PowerPoint slide as part of their assignment. Although standard classroom behavior and hallway behavior was noted, once students arrived at the computer lab, it was noted

that the students exhibited a marked change in behavior. Students began to get excited about learning, and showed pride in their work. All students reported enjoying the assignment and stated that they felt more motivated.

Perceptions of Technology in Daily Life

Almost every teacher will agree that a ringing cell phone disrupts academic performance, but the practices regarding cell phones range from outright banning of electronic devices to much more relaxed policies. Most teachers believe that electronic devices are unnecessary for the students to have in the classroom, where students see technology as an integral, day-to-day life item and essential for safety (Thomas, O'Bannon, and Bolton, 2013).

Some teachers continue to lecture students in a manner that may not engage learners. Their students, therefore, tend to believe that a classroom that is disconnected from the so-called 'real world' is artificial and fake (Baker, Lusk, and Neuhauser, 2012). PowerPoint software allows a teacher to present information in a visual manner (Goodin, 2012), however teachers who relied primarily on this technology were often found as authoritative and the technology was seen as a negative (Baker, Lusk, and Neuhauser, 2012). This image of the authoritarian is furthered when instructors continue to limit or control the use of technology in the classroom, creating a learning barrier. It should also be noted that the authors spoke to the instructors, and the consensus was that the modern-day student also lacks the self-control and maturity level necessary to have electronics in the classroom, hence the rules governing classroom electronics (Baker, Lusk, and Neuhauser, 2012).

From the cell phones that sit in our pocket, to the car we drive to work, and the machine that makes our coffee in the morning, it is safe to say that technology is a part of everyday life

whether it is a conscious decision to use it or not (Egbert, 2009). It would be counterintuitive for a teacher to utilize outdated techniques designed during a time when there was no technology in the classroom if the average student is utilizing technology on a day-to-day basis. A paradigm shift in modern pedagogy must occur if teachers are to more fully integrate technology into classroom instruction. Teachers will have more approaches to engage students in learning activities through a technology based learning environment. Student perspectives on school-based learning will change and students may be motivated in the classroom and achieve at higher levels.

Integrating Technology in Classrooms

Information technology has become common place in the classroom, helping to elevate and replace outdated pedagogical techniques and offering teachers the ability to design curriculum in advance with regards to differentiation (Mulrine, 2007). Even with regards to the amount and use of specific technology in the classroom, and even though some technology may not have originally been designed to align with educational goals, many teachers still find ways to integrate technology into the classroom (Zimlich, 2015).

In a study performed by Zimlich (2015), six graduates from the master's level certification program at the University of Alabama were followed in the professional world to observe their lesson plan effectiveness using technology. It was found that the quantity of technology in the classroom was not the deciding factor about whether or not the technology implementation was a success, but rather the quality of the specific use of technology on behalf of the teacher. This quality helps the teachers stand out in the minds of the students.

The plethora of tools and the user-friendly nature of technology offers students a unique

ability to collaborate with peers (teachers and students alike). Google Drive and Google Doc technology offers students the ability to work on a collaborative document (similar in nature to documents, spreadsheets) with one or more co-authors who are in different locations (Eckstein, 2009). Weblogs (or blogs for short) also offer users similar opportunities, allowing someone to publish comments and ideas in a public forum where a reader can then comment. This type of technology gives students the ability to publish ideas and thoughts about their own learning, sharing thoughts similar to a discussion session in a classroom (Eckstein, 2009).

Motivating Students with Technology

In a collaboration between several universities, Teo, Su Luan, & Sing (2008) explored the future intent of pre-service teachers to use technology. The survey utilized items that were validated from previous relevant research using the Technology Acceptance Model (known as TAM). It was noted that there were differences between Singaporean and Malaysian teachers on technology's percieved usefullness, perceived ease of use, and computer attitudes. Despite their differences in stated beliefs, there were no differences in the behavioral intention towards technology acceptance.

In his study, Teo (2009) surveyed student teachers' intentions to use technology in the classroom. One hundred fifty-nine participants completed a questionnaire based on TAM. It was found that the TAM is a valid model for helping explain the use and intent of technology, as well as revealing that a person's attitude towards technology has a large influence on its use.

There are many reasons why students may feel more motivated when technology is in the classroom. Liu (2016) performed a study amongst elementary school classrooms. In this study, 31 teachers were followed over the course of eight weeks. At the end of the study, the teachers

were asked the question “why did you choose to use technology in your lesson?“ There were several different responses ranging from 14.8% stating that it met the individual needs of the learners (differentiation and inclusion), to 17% stating it helped with behavior management and routines. The largest set of respondents (31.1%) stated that it helped with student engagement and motivation, and helped the teachers to make more literature-based connections that were more entertaining and interesting to students.

In a study by Thomas, O’Bannon, and Bolton (2013), teachers were asked if cell phones could increase student learning. More than half (59% of those surveyed) felt that in this day and age, cell phones could help increase student engagement and motivation. Previously, the barrier to overcome allowing cell phones in the classroom was the perception that cell phones would be disruptive to the learning environment. Even students in the Berry and Westfall (2017) survey felt they notice more frequent interruptions in the classroom, even if the communication is non-verbal (that is the use of cell phones for something other than talking on them). However, in the Thomas, O’Bannon, and Bolton (2013) survey, 61.5% of the teachers surveyed felt that the barrier limiting cell phone use in school is access and cost, not disruption. It should also be noted that 51% of the teachers still believed that classroom disruption was also a major limiting factor to allowing cell phones in class.

There has been a lot of research on the motivating qualities of technology, but there has been a lack of research on the rigor learning within technology-based academic programs. As discussed before, teachers and students understand the need for technology in the classroom, but there is an under-utilization of said technology (Gray and Lewis, 2010). In a study by Stone, Alfeld, and Pearson (2008), it was noted that 37% of the 12th grade students who would be

entering into college and into the workforce were performing below basic levels in the area of math. It was noted that the issue was not a lack of math, but rather the approach and the rigor of the programs implemented. Stone, Alfeld, and Pearson (2008) suggested the use of Career and Technical Education (CTE) courses, which would be more rigorous and more relevant math classes. It was determined that the CTE classes provided an opportunity to increase the rigor of the programs, which can lead to better post-high school success.

Influence of Technology on Inclusive Education

There have been shortcomings in the development of accommodations for students with learning disabilities using assistive technology. Floyd and Judge (2012) conducted a study on the micro level, following the progress of six students who had some form of a learning disability. The study was completed through the use of a piece of technology called ClassMate Reader. A reading and comprehension passage was given to all students. Students were then asked to test using traditional pen and paper methods, followed by a second assignment completed using the ClassMate Reader. The results showed that the use of assistive technology is an effective support and accomodation for students with learning disabilities.

In an effort to support the potential of technology in the classroom to strengthen inclusion of all types of learners, Futurelab (2009) published a report showing a variety of ways that technology can support inclusive practice concepts. For instance, mobile technologies help provide an authentic and meaningful learning experience. Audio-visual (including video conferencing and presentation software) media not only provide an authentic and meaningful experience, but they also foster a sense of community.

The idea of the Futurelab (2009) report can be easily translated into the every day classroom. Not only do the podcasts, blogs, and wikis help with a variety of inclusionary practices (community sense, learners taking ownership, collaborative/cooperative learning, and problem solving), but many of these online technologies are readily available for free from a variety of sources.

Assistive technology supports teachers to establish and maintain an inclusionary environment by allowing a student with an identified learning disability to access education at the same pace as the regular education, as was seen with the ClassMate Reader in the study completed by Floyd and Judge (2012). However, as seen in the study by Flanagan, Bouck, and Richardson (2013), these programs may be cost prohibitive, not only in the purchasing of technology, but also in the area of training. They go on to state that further research should be completed, as there is a lack of literature in that area.

Students with Learning Difficulties and Disabilities

Usher and the Center on Education (2012) focused on what motivates students to engage in learning activities who have difficulties in the traditional core courses. What kinds of non-standard techniques can be used to get students who are uninterested or unmotivated to become interested in academic learning and succeed? Can non-academic interests be used to motivate a student inside the classroom? With the final goal to motivate students in school and make classwork more interesting, several methods were applied to test, including, but not limited to, ‘real world’ applications, hands-on work, and perspective changes (e.g. using social media or video games/technology).

In their 2011 study, Ernst and Moye (2013) identified several major difficulties experienced by students in the primary education system, including a student‘s feelings of social isolation. They also noted that students with specific at-risk indicators (such as a disability, economic disadvantage, or who are second language English speaker) were more likely to have difficulties. To counter the feelings of isolation, Ernst & Moye (2013) proposed that a technology education classroom may help alleviate and remedy these problems. This classroom would offer the opportunity to learn communication and socialization skills in a controlled environment that the students are familiar with, which may not be the case in other standard classrooms. It was concluded that students with at-risk factors are more likely to have their emotional needs met and an increased social interaction when exposed to technology integration in the classroom.

Flanagan, Bouck, and Richardson (2013) studied the perception surrounding the use of assistive technology from the perspective of a middle school special education teacher during literacy instruction. The students who were participating in this particular study were identified as having high incidence disabilities. Although teachers felt assistive technology was effective, cost and technology-specific training was prohibitive. At the time of the study, it was noted that there was a small body of literature on the topic of assistive technology and its implementation in education (Flanagan, Bouck, and Richardson, 2013).

Student-Centered Learning Environments

When creating a bottom-up design for a classroom curriculum, adding a virtual learning environment helps create an environment of differentiation, where students of every ability level are able to engage and get excited about learning (Mulrine, 2007). These learning environments

help create an environment where curriculum and information technology can be blended together, offering many creative possibilities for teachers. The virtual learning environment also helps streamline assessments by allowing the teacher to generate and share rubrics with their students created directly from the curriculum (Mulrine, 2007).

Grismore (2012) states that “educational technology meets the needs of a diverse group of learners while assisting teaching in getting all students to achieve at high level” (p. 2). This research suggests that, through the proper use of technology integration, all students can have a high level of achievement. However, this same integration can have the opposite effect when utilized inapropriately. Grismore (2012) states that it becomes easy for a teacher to use technology “for technology’s sake“, thereby becoming ineffective.

There are a variety of approaches to technology integration that exist to help all students become academically successful. In a three-step model presented by Norris and Lefrere (2011), there are allowances for a change in roles of the faculty, mentors, and allows for a dyamically updated curriculum (which allows teachers to make changes quickly to support the needs of their students). First, information (which is easily accessed by the internet) helps learners find information. Next, a collaboration must occur. Finally, the participants will pass on learned experiences. Other research supports this approach to technology integration to create more inclusive learning environments (Norris and Lefrere, 2011).

This idea of using technoogy to quickly respond to students can be utilized in a variety of instructional settings. The Enhancing Education Through Technology (Ed-Tech) Program in Vermont aims to close the achievement gap by providing access to a variety of technology (such as smart computing devices or software), to use data for improving the school, and to support

teachers through online courses and a variety of other services (Margolin, Kleidon, Williams, Schmidt, & American Institutes, 2011). It was found that the Ed-Tech program was successfully implemented by teachers, and promoted student-centered instruction.

The Florida Center for Institutional Technology proposed a Technology Integration Matrix (2014) that allows educators to effectively use technology and create a meaningful learning environment. This matrix allows teachers to evaluate their own curricula and technology integration, and determine how best to progress.

According to the Technology Integration Matrix (2014), the progression of technology integration follows this progression: Entry, Adoption, Adaptation, Infusion, and Transformation. In this case, Entry refers to a teacher who has no prior technology utilization, and Transformation refers to a teacher who has full and complete technology utilization.

Conceptual Framework

The research cited here suggests several major points. First, the students of today are surrounded by more technology than ever before, and the current pedagogical methods that are being used by teachers does not necessarily match the level that the students are expecting their teachers to use. It is also understood that the use of technology helps students feel more self-confident, thereby increasing motivation and the eagerness to learn (Heafner, 2004). A more sophisticated use of technology in pedagogy helps teachers to be inclusive to all levels of students (from low performance to accelerated performance) (Mulrane, 2007). Finally, integration of new technology is a multi-phase process as noted above (Technology Integration

Matrix, 2014). Recognition and use of such a framework allows school leaders to work more effectively with staff and students as they use technology in the classroom as well as in the real world.

Conclusion

In an article published by Herold (2016), researchers describe a general shift in thought by many school leaders. School staff are no longer debating whether social networking should be used, but rather which one to use. Websites such as Facebook can be used for a variety of reasons, from school events to class projects. Online learning is on the rise across the country in all levels of education, from primary, to secondary, to post-secondary education.

A recent article in the Hartford Courant described technology in the Connecticut public schools. It was noted that in New Haven, many schools have begun teaching keyboarding skills to children as early as six years old, and in Glastonbury, incoming high school students are given iPads to use. (Frahm, 2014). The University of Connecticut hosts an annual conference for a variety of educators who would like to use iPads in the classrooms, and each year, it is sold out.

Today's generation of students are growing up in the information age. Access to a variety of technology and the internet is not only accessible, but necessary. To be most effective, students must be taught in a manner in which they learn best. When put into a technology-supported environment that is more conducive to their students' learning style, teachers can utilize a variety of technologies that have the potential to engage students and support constructivist approaches to learning, for example, Google Docs, SMART Boards, clicker based response systems, and other types of interactive technology. The goal of educators is integration of existing technologies for productive learning.

CHAPTER 3

METHODOLOGY

As stated previously, contemporary students have grown up learning differently than those of the past. Teaching methodologies must change with the times in order to motivate and include all levels of students. Once again, in order to maintain anonymity for the participants included and to satisfy my IRB exemption, the pseudonym New England Charter School, or NECS will be used to protect the identity of participants. This study was completed using data obtained at NECS. This school serves students who are not economically positioned to learn the skills needed to succeed in mainstream society. As stated on their website, the mission of NECS is to prepare students who have little or no financial or technological resources at home and are dependent on school for range of learning opportunities. This goal is realized through a strong academic curriculum with an emphasis on math and science. The New England Charter School's website goes on to speak about the leaders' vision, stating "We, at NECS, are united with the same ideal that all children can learn and strive toward their highest levels of capability as long as they are given the opportunity".

In the present day and age, technology is all around us, with the wealth of knowledge about the humanities present at the click of a button (Egbert, 2009). It is important to understand that the method in which present day educators were taught has changed substantially, and a new generation of students require a vastly different approach. The mission of the New England Charter School is to prepare the students for the rigors of the real world, which means they need to be taught in a method that does so. To understand and design a curriculum that integrates technology in the most effective way, this study examines the current implementation of

technology at the New England Charter School, student perceptions surrounding technology usage in the classroom, and current technology accommodations for identified students.

The main research question that guided this dissertation is: How do present-day educators utilize technology to engage students in learning activities? Questions that guided data collection were:

- Do students report technology use in the regular education classroom being used to accommodate all levels of students? If so, do they feel that more or less technology is needed or necessary?
- How is technology used to enhance instruction for identified students (students using an Individualized Education Plan [IEP] or 504 accommodation plan)?
- What is the current state of assistive technology at this site and how is it used to engage identified students in learning activities?

To answer the question on the students' perceptions of technology in the general education classroom and its impact and efficacy on motivation, a survey was given to the student population in an urban charter school (the first of three data sources). This survey addressed students' beliefs about the first research question on the reported use of technology in the school. Next, a review of student IEPs and 504 accommodation plans assist in answering the second research question on how technology is currently used as part of identified students' instructional plans. The purpose of these student plans is to document student strengths and areas of weakness and how to best accommodate their disability with the purpose of enhancing instruction for specific identified students. Finally, the classroom observations assisted in answering the third

and final research question on how assistive technology is currently utilized in a purposeful sample of classrooms at the site.

Setting

The New England Charter School (NECS) is a public charter school in an urban environment in New England, and is comprised of students from grades 7-12. NECS is a STEM (Science, Technology, Engineering, and Math) school, where STEM courses are balanced by a strong education in the humanities, a character education class, college preparation, and a strong student-teacher-parent collaboration. Chudowsky and Ginsburg (2012) define a charter school as an independent school system with large autonomy from local districts where attendance is a choice.

Participants/Sample

NECS had a student population of 348 students and a staff size of 65 at the time of research. Participants in this research study were taken from the population of NECS (students) on a purely voluntary basis to take an anonymous survey. This seven question survey was disseminated during January and February 2016 in the homerooms of all students at NECS. Each student was given a copy of the survey along with an assent form, which was explained in detail. All students were then given several weeks to complete the survey and turn it in anonymously by dropping it in a designated mailbox. The results were then compiled into tables.

The second data source was individual student records, specifically through the internal documentation of students with identified learning disabilities. NECS utilizes Student Support Cards, which will be described in detail in the next section. It is important to note that the

documentation examined and reported here represents all students at the school with records, not a sample of the students.

The third and final source of data was classroom observations of two classrooms, a regular education classroom and a special education classroom. These sample classrooms were purposefully selected as they represent a standard classroom where the teacher must specifically implement accommodations to support and meet the goals of identified students, and a special education classroom, where every student is an identified student and all have specific accommodations that must be met.

Data

Descriptive data was collected from three sources: Student survey results, student records, and direct classroom observations of classrooms. All students surveyed were asked to take an anonymous survey which asked questions based on technology use and feelings towards technology use at school (see Appendix A). These responses were compiled into several tables to provide insight into student's current feelings towards technology and its effectiveness at NECS. The initial question determined the grade level of participants. The two technology questions were used to determine the relationship between owning a computer at home and utilization of a computer for homework purposes (not necessarily in the home). Additional questions were used to determine the level of motivation students associated with having technology in the classroom. The final two questions were used to determine student feelings of inclusion as it relates to technology in pedagogy.

The second source of data for this dissertation came from the NECS Student Support Cards. These cards (also known as SSC) are internal documents at NECS designed to help

teachers understand and follow accommodations for students with an IEP or on a 504 plan. As seen in Appendix B, there are several sections for the teacher to review and utilize when planning lessons. After introducing the basic demographic information, the SSC presents the student's area of strength and area of need. The SSC then describes the service delivery goals, where student's pull-outs or push-ins are identified, along with any educational goals. The last two pieces of information were the source of data for this dissertation. The accommodation list offers samples of specific accommodations that are required by a student's IEP, and state testing accommodations do the same as recommended by the state. During data collection, specific accommodations on this list that utilized technology were identified and documented.

The third source of information came from direct administrative observations of how teachers are utilizing technology to engage students in the learning process. During the course of this dissertation, I changed job titles at the school, becoming the Middle School Dean of Students. The role of Dean offered a unique position to be able to enter classrooms and perform observations of the specific use of technology in classrooms along with any specific accommodations as required by the student's IEP. There were two classrooms (as described above in the sample section) and the information generated during these observations was compared directly against the SSCs as created by the Student Support Office.

Background of the Technology Implementation

This study was completed after a one year technology implementation effort. The roadmap of that intervention follows. To carry out this intervention, a leadership strategy was necessary. Gallos (2006) identified six methods for leaders to utilize in the decision-making process: decision by lack of a response, by formal authority, by self-authorization or minority, by

majority rule, by consensus, and by unanimous consent. Ideally, one would prefer decision by unanimous consent, but this does not always happen. For the purposes of this study, two decision making strategies were identified for use: by unanimous consent and by formal authority.

NECS has a technology team made up of members who put forth proposals for future technology use, of which I am a member. However, the current staffing population at NECS involves only one technology administrator for the entire school population. It is their job to install and maintain all forms of technology in the school, as well as train every staff member on their proper use and maintenance. The job responsibilities include everything from installation of a building-wide phone system to disassembly and reassembly of broken computers.

The Technology Implementation Roadmap

In order to see the progress of technology implementation and its effects on a student population, I partook in and observed a technology implementation plan at the New England Charter School (NECS). The technology implementation at occurred during the 2015-2016 school year and focused specifically on implementation of technology into the classroom, including but not expressly limited to Google Chromebooks, SMART Boards, proximity cards, and cloud printing. During this time, I documented the timeline of technology implementation, then administered a post-implementation survey to gauge student motivation and interest due to the technology that was installed in the classrooms. The dates utilized here were the ones used by NECS and by me during the course of this dissertation.

<u>Order Laptops (by May or June of 2015)</u>

NECS ordered laptops as a part of the technology updating plan. These Google Chromebooks were placed on several floors in the building in order to allow for ease of access by the teachers

and the students. Each student is given a school email address, which also functions as login credentials for the Google Chromebooks. Each student is also given login information for a school database, which contains access to all of the student academic progress.

Planning (June through August 2015)

At the post-school year meetings (at NECS, these take place during the last two weeks of school during the month of June), the teachers were tasked to begin making curriculum changes and implementing projects to get full use out of the recently purchased laptops, SMART Boards, and other technology. This was being supported by a pre-training by the technology administrator on laptop use, SMART Board use, and additional technology installed in the classroom.

Train Staff (August 2015)

One week prior to the student's arrival, the teachers came to the school for a series of professional developments and in-service training. During at least one of these sessions, the technology team gave an in-depth presentation on the current state of technology in the school. Further in-service training was given as needed in the operation of the various technologies installed throughout NECS.

Use of Technology (August through June 2015-2016)

After all students have received training and signed technology contracts, the new technology can be distributed and utilized. During this utilization period, teachers were given additional in-service training as new technology was installed in the school (such as proxy cards for use with printers and secure cloud printing with interchangeable login information at any computer).

Post-Implementation Survey (February 2016)

During the course of the implementation process, it was important to understand see how students are affected by the incoming technology, and their feelings of motivation and inclusion towards technology. The results from this survey were compiled, and can be seen in Chapter 4 of this dissertation.

Post-Implementation Observation (January and February 2017)

It was also important to see how the technology that was installed was implemented in practice. This focus on implementation (for the purposes of this dissertation) occurred during the following school year, and centered on the approaches the teachers used in order to be inclusive of all levels of students. During this observation, I watched closely for student engagement in learning activities and teacher adherence to Student Support Cards.

Analysis

There are three main steps that were accomplished to gauge project effectiveness after the technology plan was implemented. The first step was to administer an anonymous student survey. This survey gauged student motivation and feelings towards technology at NECS. The second portion of the data analysis was through data analysis of student IEP/504 accommodations and through direct administration observation.

Once the baseline was established, the trial period began. In this part of the experimentation stage, teachers began teaching using a curriculum that focused on utilization of new technology in the classroom (such as SMART Boards, document cameras, and other technology). It is important to note that the process was documented using periodic smaller

assessments (through quizzes and other benchmarks designed by the teacher using Common Core Standards) as well as continual feedback from both students and staff.

After the trial period was over, a post-assessment was given. This was given in the same method as the pre-assessment using a major test and data analysis. Student growth was charted over the course of several school years, and was compared with student growth during several non-experimental years (before pre-assessment). By doing this, the effects that the technology application had on academics could be observed. It was determined that the data was inconclusive and further study would be needed to determine if there was a correlation between motivation and grades.

The success of the implementation from the students' perspective (or lack thereof) was checked in multiple ways. One method was through the use of post-intervention surveys, which were administered to all students. The anonymous surveys will help the school administration gauge perception of the technology plan. The second source of data analysis involved examining student accommodation plans and observing their direct implementation in a classroom (regular education as well as student support office).

Participant Rights

For the survey part of the study, all participants consented to participation using a consent form (see Appendix A). All personal and identifying information will be removed at the time of utilization. This study is completely voluntary, and anyone wishing not to participate will have the option of removing themselves from the research study at any time.

To protect student rights, several steps were taken. On site, the executive director of NECS and affiliate committee member Sanela Jonuz was on hand as a Civil Rights

administrator. Sanela has worked at NECS for 10 years, and is one of the founding charter members. During this technology implementation, Sanela was one of the main driving forces behind the plan through formal authority (Gallos, 2006), as well as the monitor of student rights.

The second step that was taken to ensure students' rights were protected was through a submission to the Institutional Review Board (IRB) at the University of New England. This submission occurred during January of 2016, and the approval from IRB to begin data collection was given on January 29th of 2016. Due to the nature of the research and working with a protected class (in this case, the subjects were minors), it was necessary to apply. However, an exception to IRB review and oversight was granted due to the anonymity of the data collection. Students were given an assent form (as opposed to a consent form), so that no identifying features to their participation in research were present. In addition, to make sure that student and school's rights were protected, I changed the name of the school to New England Charter School (NECS) for the purposes of this dissertation to make the site anonymous.

Potential Limitations/Biases of Study

1. The study was carried out at a charter school. Therefore, findings from this study may not apply to more conventional public schools.
2. Charter schools, being a relatively new type of school, are often perceived as competing with traditional schools, rather than providing an alternative education.
3. I am a current employee of the school being studied, so findings of the study may be biased.

4. The study is limited to an individual school in an urban New England community. Therefore, findings from this study may not necessarily apply to other schools, especially from other states.
5. The completion of the surveys was voluntary for students. Therefore, some of the students chose not to participate, thereby limiting the sample size.
6. The classroom based observations were conducted on a purposeful sample may have been conducted on a day where the classroom activities did not require specific interventions as I was looking to observe for.
7. Due to high turnover ratio, several members of the original site study report are no longer working for the institution, and several new members have been employed.

CHAPTER 4

FINDINGS

Chapter 4 presents the data gathered in response to the research questions. The first section addresses student survey data and the second section addresses implementation of technology in classrooms with identified students. To show a presence of any trends with motivation, I performed a data analysis with three distinct sources of data. The first data source was a survey, which was administered to the general population of the school. This survey consisted of seven questions, several multiple choice and several yes/no questions (see Appendix A).

The second data source was the individual student documentation of learning disabilities through a student support card (an example can be seen in Appendix B). NECS aids students using Individualized Educational Plans (IEPs) and 504 plans, both of which provide students with specific accommodations based on their proficiency level due to either physical-, mental-, or health-related disabilities. As seen in Appendix B, these accommodations range from time related help (extended testing time, frequent breaks) to technology related help (including but not limited to the use of a timer, Google Drive to submit assignments, or other similar technologies).

The third data source was direct administrative observations conducted in two different classroom settings: a general education classroom and a special education classroom focusing on observations of students utilizing assistive technology. In the general education classroom, I observed a middle school classroom during the course of a regular lesson. The teacher in this classroom was a core subject teacher who has been with NECS for more than 3 years, and is a teacher who the students see twice daily.

I also observed a special education classroom, in which most (if not all) of the students receive services with accommodations. In this classroom setting, there are four teachers (all of whom have been with the NECS system for several years) who make up the special education team. In this classroom, students may have either scheduled pull-outs, or may come down when the students themselves feel they need extra help. In both environments, specific implementation of technological accommodations in line with their IEP was observed and documented.

Analysis Method

The first source of data was a survey, which was given to a total of 348 students at NECS and 95 of the surveys were returned. The return rate was 27.3%. Respondents were asked to provide their grade level and answer 7 questions. Questions were based on Yes or No responses, multiple choice responses, and more-or-less responses.

The second source of data was collected through a review of the internally created Student Support Cards (or SSC) at NECS. These SSCs are created based on each student's Individual Education Plan (IEP), which are then shared with all the teachers who work with that student. Each SSC has several sections for the teachers to consider. The top of the SSC contains the basic information for the student (name, grade, date, and disability). The next section details a student's area of strength and weakness. These can range from subject matter skills (English, Social Studies, or other subjects) to executive functions to self-advocacy. The third section focuses on service delivery and goals. These typically mention classroom pull-outs (the student meets with a teacher outside of the regular classroom) and push-ins (the teacher comes into a classroom led by another teacher), meeting schedules, and individual goal setting. The final section of an SSC indicates a student's specific accommodation list, both for students and for

state testing. This list provided the data regarding technology. A sample of an SSC can be found in Appendix B.

The third and final source of data was through direct administrative observation in the classrooms where the requirements outlined in the SSCs were being implemented. There were two classrooms that were observed during the course of this dissertation. One of the classrooms is a regular education classroom with supports implemented through the use of SSCs. The other classroom is the special education classroom, where all students have an SSC.

Survey of All Students

The first source of data was a student survey. The survey, which was administered in January and February of 2015, can be found in Appendix A. The results can be seen in Table 1 below.

Table 1

Respondents to Technology Survey by Grade

Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	No Response
20	0	24	3	5	11	32

Question 1 of the survey asked students to identify their grade level. In the 95 respondents to the survey, 20 identified as 7th grade, 0 identified as 8th grade, 24 identified as 9th grade, 3 identified as 10th grade, 5 identify as 11th grade, 11 identify as 12th grade, and there was a total of 32 students who chose not to identify. This large group of students did not indicate the reason behind not identifying their grade level.

Table 2

Respondents to Question on Computer in the Home

Yes	No
20	0

Question 2 asked a yes or no question, about whether the respondent had a computer in his/her house. In the case of questions that were raised by the students regarding what a computer was identified as, I identified a computer as a laptop, desktop, tablet, phone, or any other device that could be used for school related work. Of the 95 respondents, 94 responded with “yes” with only 1 student responding “no”.

Table 3

Respondents to Question on Computer Usage for School

0-5 hours/week	6-10 hours/week	11-15 hours/week	16+ hours/week
20	0	24	3

Question 3 asked a multiple-choice question, asking how often the respondent used the computer for homework or school related activities. The students had four options to choose from. 37 students responded saying they utilized their computer for school activities 0 to 5 hours per week, 31 students stated they used their computer 6 to 10 hours per week for school work, 13 students stated 11 to 15 hours, and 14 students stated 16 hours or more for school related work on a computer at home.

Table 4

Respondents to Question on Motivation Through Technology

Very Motivated	Motivated	Not Motivated/Unmotivated	Unmotivated	Very Unmotivated
38	35	21	1	0

Question 4 asked a multiple-choice question, asking how motivated the respondent felt when a teacher utilized technology in the classroom. 38 students stated they felt very motivated, 35 students stated they just felt motivated, 21 stated they felt neither motivated nor unmotivated, 1 student stated they felt unmotivated, and no respondent answered very unmotivated.

Table 5

Respondents to Question on Technology in Class

Yes	No	No Response
81	13	1

Question 5 asked a yes or no question, and asked if the respondent felt that the teachers could utilize the technology currently available at NECS. Of the 95 respondents, 81 students responded “yes”, 13 students stated “no”, and one student abstained from responding.

Table 6

Respondents to Question on Student Feelings Towards Inclusion

Yes	No	No Response
87	7	1

Question 6 asked a yes or no question, and asked if the respondent felt that the specific use of technology at NECS allows all levels of students to participate equally (gifted/talented students, regular education students, and special education students). Of the 95 respondents, 87 students responded “yes”, 7 students responded “no”, and one student abstained from responding.

Table 7

Respondents to Question on More or Less Technology in Schools

Yes	No	No Response
81	12	1

Question 7 asked a more-or-less question, and asked if the respondent felt that schools in general should use more or less technology than is currently being used. Of the 95 respondents, 81 responded that “more” technology should be used, 12 responded that “less” should be used, and 2 students abstained from responding. In the second set of data, specific technological accommodations from student IEPs will be identified.

Student Support Cards

At NECS, there were a total number of 39 students who are provided services through the Student Support Office. The Student Support Office currently has 4 teachers who serve students from grades 7 through 12. There are also students who are on a 504 plan, which also offers its own set of accommodations. At NECS, there were a total number of 10 students who are provided services through the 504 coordinator. The coordinator serve students from grades 7 through 12. See Table 8 below.

Table 8

Number of Identified Students Who Have Accommodations (IEP or 504)

	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
IEP Students	9	7	8	6	4	5
504 Students	2	0	3	1	2	2

From this data, specific technological accommodations were identified. They are as follows (along with the number of students identified who have the accommodation):

Table 9

Specific Accommodations as Used on IEPs

Use of Calculator	Computer for Writing Assignments	Scribed Responses	Google Drive for Assignment Submission	Use of a Timer	Use of Email for Workload Organization
6	8	5	6	4	4
Use of Computer/Tablet	Speech-to-Text Program	Pictures to Track and Submit Assignments	Digital Copies of Homework	Fidget Toy	Use of Cell Phone for Organization
1	2	2	2	1	1

Like the data from IEPs, I also identified specific technological accommodations. They are as follows (along with the number of students identified who have the accommodation):

Table 10

Specific Accommodations as Used on 504 Plans

Fidget Toy	Typed Responses	FM Sound System (for Hard of Hearing)	Use of a Timer
IEP Students	9	7	8

Administrative Observations

There were two main classrooms that were observed during the course of this research. The first was a regular education middle school classroom, and the second was a special education class in the Student Support Office at NECS. In order to protect the privacy of the individuals observed, specific identifying details about teachers have been removed as each grade level at NECS only has one teacher per subject.

Classroom 1

The first observation took place in a regular education middle school classroom in one of the four core subject classes (at NECS, these are identified as English, Social Studies, Math, and Science). During the course of this class, several specific accommodations and pedagogical techniques were observed that were taken directly from a student's SSC. In this class, one student was given a laptop in order to type a response on an assignment, which was then submitted digitally for teacher approval. Another student in the class was given the opportunity to use a multi-sensory approach by being given the opportunity to do their work on the classroom SMART Board. All students who were in this class with a 504 plan or an IEP were checked in on frequently by the teacher.

Classroom 2

In the special education class, documentation indicated a much more detailed and implemented approach than in the regular education classroom. Students who come to the special education classroom have 4 teachers they can check in with, each of whom have a grade level specialty (one teacher for middle school grades, one teacher for grades 9-10, one teacher for grades 11-12), and one coordinator who oversees all of the curriculum and coursework. In this space, students are given the opportunity to have a more individualized approach and direct access to their IEP coordinators. Students were observed to have access to computers (both laptop and desktop), headphones with noise-cancelling technology, fidget toys, timers, calculators, and even a cell phone to organize and plan homework and schedules.

Comparing the Two Classrooms

The biggest difference between the two settings was that in the regular education classroom, only identified students on an IEP or 504 plan were provided with accommodations, including the specific use of technology. The teacher catered to the needs of their class as a whole, going at a pace and utilizing material that allowed accelerated students to remain on task and stay challenged while providing accommodations to certain students to allow them to connect and understand the material. However, in the special education classroom, all students are identified students with unique accommodations, and everyone’s needs are met through smaller group instruction (in terms of teacher-student ratio).

Summary

In the student survey, the majority of the students (94 out of 95) responded that they had technology at home, but not as many utilized it for educational purposes (27 out of 95 students

reported 10 hours or more). This is similar to the study by Ehrlich, Sporte, Sebring, and the Consortium on Chicago Schools (2013), where less than half of their students utilized technology for education. However, the majority of students (73 out of 95) surveyed felt that technology motivates them, as was similarly found in Goodin's (2012) Action Research Project. NECS could utilize more technology in the classroom.

Upon reviewing the IEP and 504 accommodation plans, there are many accommodations required to enhance student learning in the classroom. There were a variety of accommodations, which included the use of laptops to digital assignment submission to use of an FM Sound System. The most common IEP accommodations were the use of a calculator, a computer for typed responses, and the use of Google Drive technology to submit a digital assignment. On the 504 accommodation plans, the most common accommodation was the use of a fidget toy. There does seem to be a pattern emerging regarding technology for accommodations, in that the students are able to rely on technology to compensate or assist in a deficient area. A student who is poor with time management no longer has to rely on self-motivation to keep an eye on the clock, but rather has a timer that can take the pressure off. Students who have difficulty with handwriting (whether physical or even neurological) can utilize a computer to organize and center their thoughts. Technology allowed students who have strengths in other areas to rely on technology to bridge the gap from deficiency to success.

Finally, during the classroom observations, it was documented in both the general education classroom and in the special education classroom that accommodations are provided for students throughout the course of the lessons. The general education class had a traditional pen-and-paper approach, however, and the students who had difficulty with the physicality of the

writing were allowed to use a computer. The key difference between the two classes is that in the general education classroom, only a few had accommodations, where in the special education class, all students have some sort of an accommodation. These accommodations are in accordance with state and federal law to support and assist students in an inclusive classroom.

The purpose of the study was to document student perceptions about the use of technology at school, and the degree of implementation of technology across the classrooms. Without the technology plan that was put into place, many of the accommodations seen would not have been possible to give to students. The findings and future steps will be discussed in Chapter 5.

CHAPTER 5

INTERPRETATIONS AND CONCLUSIONS

The purpose of this study was to: 1) find out students' perceptions of the use of technology in their classroom-based instruction; and 2) to describe current use of general technology and assistive technology in classrooms that include identified students (those with documented learning disabilities).

The significance of the study is to add to the body of research surrounding the effects technology has on motivation and inclusion. Research was conducted concerning how students currently experience the use of technology at school through classroom technology use and technological accommodations as provided on an IEP or 504 plan. These findings can go on to inform a variety of audiences, from Boards of Education down to the actual teachers who provide technology implementation.

Students who actively participate and engage in their education will learn more effectively and will make stronger connections between other subject areas (Piaget, 1955). Therefore, teachers must teach in the style that will influence their students' learning the most, and technology holds the possibility and the flexibility to be able to do that (Ford & Lott, 2011).

It becomes necessary to teach and disseminate information in the method that the person (or learner) receiving the information best learns in. In the case of the modern-day student, it becomes necessary to utilize techniques of differentiation and technology to best suit these learners (Gensburg & Herman, 2009). A major paradigm shift from the old style of lecturing without technology must be altered to suit the needs of the modern student.

Teachers who have infrequently utilized technology in the past may have problems making this shift, however when a teacher begins from a ground up approach and fully embraces frequent technology use will feel more successful and ready to meet the needs and challenges of the 21st century classroom (Meyer, Abrami, Wade, and Scherzer, 2011).

Presentation and Interpretation of Findings

Guiding the course of this dissertation was a single research question, which inquired about technology integration and its use in engaging students in learning. This was addressed through three additional related questions.

Research Question 1. Do students report technology use in the regular education classroom being used to accommodate all levels of students? If so, do they feel that more or less technology is needed or necessary?

The first related question addresses the presence of technology in the regular education classes through differentiation. As shown through student surveys as well as through the research, students and teachers alike perceive technology as being ever present in daily life, but is rarely utilized or underutilized for work related to school (Ehrlich, Sporte, Sebring, & the Consortium on Chicago Schools, 2013).

Research Question 2. How is technology used to enhance instruction for identified students (students using an Individualized Education Plan [IEP] or 504 accommodation plan)?

The second related question addresses the effect technology has on students with disabilities using a IEP or 504 plan. These IEP and 504 plans specify which type of technology can be used and how they should be used. One student may be allowed to use their cell phone in order to utilize the calendar function to organize their day, while another student can use a word

processor to submit work electronically. All of these technologies are implemented in both the regular education classroom and the special education classroom in order to provide individualized instruction to identified students.

Research Question 3. What is the current state of assistive technology at this site and how is it used to engage identified students in learning activities?

Finally, the last question addresses the importance of assistive technology and its use to engage and motivate students in learning activities. All of the technology that is surrounding the students in their daily lives are quickly and easily accessible, from a computer at home to the cell phone in their pocket (Egbert, 2009). These same devices that are familiar to the students, when used in the classroom to assist and support, help motivate and engage the students (as seen by the student survey). A student who can access the curriculum on an individual basis, and is excited and motivated to learn, will learn better, leading to better engagement in learning activities.

Summary of the Findings

The findings from the three research questions suggest some emerging patterns. Nearly all students had technology in the home, be it a cell phone, desktop computer, or similar computing device. These devices were not fully utilized for school work. It was also found that most students felt that technology usage in the classroom was motivating, as well as having the added benefit of allowing students of all levels (learning impaired to gifted and talented) access to education at NECS. As seen in the study completed by Usher and the Center on Education (2012), non-standard learning techniques when combined with technology allowed uninterested and unmotivated students with learning difficulties to be able to be engaged. Some educators also find that to motivate gifted and talented students, additional opportunities to complete

coursework at an accelerated pace can be provided through the use of technology (Housand & Housand, 2012).

It was also noted that, just like the study performed by Erlich, Sporte, Sebring, & the Consortium on Chicago Schools (2013), there was an underutilized or inconsistent use of technology in the education process, both in the classroom and at home. While the teachers may feel that the technology is helpful but not necessary, students frequently view technology as a main component to daily life (Thomas, O'Bannon, and Bolton, 2013).

Many of the students feel that technology usage at NECS is underutilized and have feelings that more technology usage would help. It was also seen that NECS does utilize technology in the classroom specifically for the use of inclusion. This inclusionary technology was observed through the use of Google Chromebooks, SMART Boards, Google Drive, and several other low-tech means (such as fidget toys) per the student's IEP. This occurred in both the regular education classroom as well as in the special education classroom.

Section 504 of the Rehabilitation Act of 1973 mandates that students with disabilities be provided with accommodations in order to prevent discrimination ("A Guide to Disability Rights Laws", 2009). 504 plans, along with IEPs, are provided to students to allow them to better access the material being provided and improve their opportunities to learn. When the law was originally written, the concept of technology in the classroom was not an explored topic, as the ubiquity of technology was not fully realized. As long as an accommodation allows access to the classroom learning at the same pace as a regular education student, this accommodation can be anything. NECS currently utilizes 504 and IEP plans that are embedded with technology in mind as a method of student access.

This access to learning opportunities was noted during my administrative observations. In both classrooms, teachers not only met the expectation to make appropriate accommodations, but planned lessons from the ground up through differentiation. By differentiating their teaching styles and utilizing technology, teachers ensured that all students were not only able to access the lesson, but they were interested in doing so.

Without a formal evaluation of the technology that is in place now at NECS, it is difficult to say whether or not the intervention was successful in terms of data. However, it is my observation over the course of this dissertation (and during my time working at the school) that the technology plan was successful. When I first arrived at the school, no classrooms had phones, there was only a single computer with a projector, and no other technology present. Since then, every classroom now has a SMARTBoard, a computer, access to a mobile laptop cart, classroom phones, security cameras, and a plethora of additional technology. Teachers, having this access, have been making great strides in incorporating technology into their lesson planning and practice, increasing its effectiveness in the classroom. It should be noted that there is always room for improvement and there is always more that can be done.

Implications

Zavieri (2014) stated that if the leadership of a system is not strong or if there is not a total paradigm shift, maintaining the status quo (difficulties in educator training and rising costs of infrastructure) will limit advances in professional development for teachers. NECS has seen enhancements in technology for instruction, but the basic structure of lesson plans has not yet fully converted to a technology-based system. Without further interventions, NECS will not be

successful in their technology intervention unless there is a total paradigm shift from a ground level approach.

The underutilization of the technology in the classrooms leads teachers to believe there is a negative impact of some technology in the classroom, which may create a separation between teacher and student understanding (Thomas, O'Bannon, and Bolton, 2013). Teachers who do not fully embrace the technology shift may hold to older styles of teaching, creating a feeling of authoritarian teaching styles. This negativity can lead to further separation between teachers and students, creating a sense of artificiality in the classroom (Baker, Lusk, and Neuhauser, 2012).

Recommendations for Action

The first recommendation is that the staff continue to innovate. Being a newer school still establishing itself, the New England Charter School staff can and should continue to innovate and push forward with further technology interventions. Combined with further teacher training on new technologies, as well as developing new curriculum and lesson planning from the ground up using technology as a base, can enhance the likelihood of further successful interventions.

The second recommendation is that administration address staff retention rates. The other problem NECS currently faces is a problem with staff retention. Even with well thought out plans, without a consistent staff, the interventions as they are designed would not function. Therefore, incentives for the teachers could aid in teacher retention, which will help maintain consistent curriculum coverage.

The final recommendation that I would make to NECS is to develop a curriculum plan that has technology embedded in the curriculum in a ground up implementation plan. Currently, the NECS lesson plan has a section where teachers can detail the activities that will be implemented in class, however it does not explicitly emphasize technology. If technology can be built in from the ground level, it will become easier and more natural to implement in practice in the classroom.

Recommendations for Further Study

It would be beneficial for NECS to follow up with subsequent interventions and reexamine the data. NECS is continuing to expand their offerings for grades. For this study, NECS consisted of grades 7 through 12. However, when data had been collected, NECS had just been granted a charter to open grades K through 6. Further interventions and curriculum planning can take the expansion into account.

Based on the data, it is also recommended that further studies about technology implementation be done in larger school districts. A larger school (or multiple schools) with similar methodologies should be studied, examining the various levels of technology integration. This would allow a deeper understanding of the true effect of technology on education.

It could also be beneficial to study the effects of technology in primary and secondary school and their lasting impact on future education. At the time of study, NECS was too young to study college graduation/retention rates or successful workforce entry rates. This type of follow up study could be accomplished in a school district that has been open for longer.

Finally, on a more macro scale, it would be beneficial to study the effects of a technology implementation plan on student achievement. Initially, this dissertation focused on the effects

technology and motivation had on grades, but the results were inconclusive. This could be due to many different factors, including but not limited to small school population, incomplete technology implementation plan, or lack of data points.

Conclusion

Technology is everywhere, and is fully integrated into the daily lives of the average student, giving that student connection to an immense amount of information (Egbert, 2009). The use of this technology in the classroom in the proper manner has the benefit of helping to raise academic achievement from the students as well as from the teachers from all levels of skill (Courville, 2011). The need for technology integration is there, but many schools have not been meeting this necessary intervention (Bolkan, 2012). However, until the current status of technology integration and perception of its usefulness has been changed, the disconnect between student and teacher can only grow larger. A paradigm shift regarding appropriate implementation of technology in education is necessary to ensure a successful 21st century classroom and to set up students for success in their future careers.

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Appendix A

Student Survey

Instructions:

1. This is anonymous. Please do not put your name or any identifying marks.
2. Before taking the survey, please read the "Assent for Participation in Research" document.
3. Please answer the questions to the best of your ability.
4. Circle the answer that best fits your response.

Questions:

1. What grade are you in: _____
2. Do you have a computer at home?
    a. Yes
    b. No
3. How often do you utilize the computer for homework and school related activities?
    a. 0-5 hours/week
    b. 6-10 hours/week
    c. 11-15 hours/week
    d. 16+ hours/week
4. How do you feel when a teacher uses technology in the classroom (such as ChromeBooks, SMART Boards, clickers, etc.)?
    a. Very Motivated
    b. Motivated
    c. Not motivated/not unmotivated
    d. Unmotivated
    e. Very Unmotivated
5. Do you feel that your teachers could utilize the available technology at NECS more often?
    a. Yes
    b. No
6. Does the specific use of technology allow all levels of students to participate equally (gifted/talented, regular education students, and special education)?
    a. Yes
    b. No
7. Should schools use more or less technology than is currently being used?
    a. More
    b. Less

Appendix B

STUDENT SUPPORT CARD Sample

Student: **Date:**
Disability: **Grade:**

Student Strengths	**Areas of Need**
Math	English – Verbal and Written
Science	Organizational Skills
Interpersonal Skills	Self-Advocacy
	Spatial Awareness

Service Delivery/Goals
Pull-out:

Goals*:*

Accommodations List (Samples):

1. Frequent breaks
2. 100% extra time on assessments
3. Small group testing
4. Test directions clarified
5. Frequent teacher check ins
6. Test Corrections when scoring below 60%
7. Graphic Organizer

State Testing Accommodations (Samples):
(01) Frequent Breaks, (03) Small Group, (04) Separate Setting, (10) Test Directions, (14) Track Test Items