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Student distractibility with school-issued computers

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STUDENT DISTRACTIBILITY WITH SCHOOL-ISSUED COMPUTERS

by

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Abstract

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The purposes of this exploratory investigation were to (a) determine if students are able to identify when and how often they become off task while using computers, (b) if middle school aged students are mature enough to self-regulate their technology use, and (c) which strategies teachers could incorporate to limit student's technology distractions.

The researcher broke this study into three phases to study reward strategies designed to keep students on task while using their devices. The first step was to gather baseline data from students and teachers using two surveys. After the educator surveys were evaluated, teachers in the social studies department in seventh and eighth grade decided which intervention strategies implemented by the students minimized student's distractions, as students tracked the frequency of their distraction in all of their classes and utilized their own self-regulation strategies. To conclude the study, the ten participating students were surveyed about what they thought about rewards and consequences, the district's computer one-to-one initiative, and which strategies worked best to limit their distractibility.

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Chapter 1: Introduction

Since the emergence of the ENIAC, the first United States computational system invented by J. Presper Eckert and John Mauchly in 1943, it became a matter of time until this machine would evolve education, learning, and society. In just forty years, the rapid transformation of technology is marvelous. Computational devices of the 1940s could boast a memory speed of 20 words. The ENIAC machine weighed thirty tons, occupied 1800 square feet, used 200 kilowatts of electric power, and contained over 18,000 vacuum tubes, 1,500 relays, and hundreds of thousands of resistors, capacitors, and inductors. (Early Electronic Computers, 2009) Now, within fractions of a second, we can have the answers to life's most burning questions and interact with others around the world while sitting in the comfort of our own homes. Computers and the internet allow consumers to communicate, unwind and de-stress, improve our lives, aid in our goals and aspirations and connect us with people around the world.

The advancement of technology generally evokes a range of emotions. Some understand technology as the method of humanities' erosion and self-destruction, while others view it as a tool to solve some of our world's greatest challenges and connect mankind globally in a medium previously unprecedented. It cannot be denied wherever you fall on the continuum of technology integration, the technological invasion of our society ushers us into a new age. Students gain knowledge through social media, websites, downloading apps and watching YouTube videos. As an educator, I find myself using the phrase "Google it" as almost a daily vernacular. Yet, when it comes to learning in the classroom, we have barely scratched the surface on what is possible. Although

today's students are digital natives, their "digital nativity" has largely gone unaddressed in the classroom, even as researcher such as Norris, Hossain, and Soloway (2011.), Brown, (2005.) (Bebell & Kay, 2010; Sandholtz et al., 1990). Dunleavy, Dextert, and Heinecket (2007) all support students are most engaged and motivated in digital learning environments implementing tools that mimic the programs or platforms used in other facets of their lives.

The Pew "Internet and American Life" project (pewinternet.org) characterizes millennials--the first generation of digital natives--as an "always-connected" generation. Despite advance knowledge of societal trends, schools have generally slowly capitalized on technology's educational potential. Pew reports that most schools treat portable devices as "a disruptive force that educators must manage and exclude from the school and the classroom…schools are immovable objects in a societal stream flowing around them" (the always-connected generation, 2010).] Teacher preparation programs, administrators, and professional associations are often reactionary to develop policies and standards for effective technology integration.

Education needs to be able to adapt to both a changing information landscape and the transformed student. We are on the precipice of a new education model, and technology is the catalyst. To quote Klaus Schwab, the founder and executive chairman of the world economic forum, "…we are not constrained by a binary choice between acceptance and rejection. Rather, the decisions we make every day as citizens, consumers, and investors guide technological progress." Leaders in education have to decide the best course to navigate the digital natives in this uncharted new world.

A landmark step on the path to technological integration in my school district took place during the 2017-2018 school year, when the Washington Township School District enacted a one-to-one computer initiative; every student received a district-issued computer. The school district also decided to introduce the SAMR model to streamline technology integration across all ten of our buildings. The SAMR model or **S**ubstitution **A**ugmentation **M**odification **R**edefinition Model provides guidelines for the integration of computer technology and its impact on teaching and learning. SAMR is a progression of educational technology and ideally, as a teacher progresses along the continuum, computer technology becomes woven into habits of good teaching and learning. There is pressure to propel the district to a full technological immersive hub, and teachers are the facilitators of this new vision. The district adopted the SAMR model to provide a common language for educators and administrators to set goals to implement long-term initiatives to improve our technology utilization. This goal will be achieved through professional development, curriculum initiatives, accountability, and researched pedagogical methods.

Although there was initial trepidation, all teachers are using more technology in their classrooms compared to before the one-to-one computer adoption. As the district moves closer to their mission statement, there is still a major concern from parents and educators. How do we prevent students from getting distracted, and keep them actively engaged? Administration asks educators and evaluates teachers based upon their ability to create environments where students are able to self-regulate and guide their own learning through technology incorporation. Rather than the "Sage on the Stage", direct instructional method, teachers are asked to make learning as self-directed for students as

possible. This becomes a challenge when students may not be biologically and developmentally able to self-regulate their own behaviors.

One of the programs encouraged for improved technology integration is LATIC, or *The Learner-Active, Technology-Infused Classroom*™. LATIC has ten guiding principles, which are founded in research, observing successful teachers, the most recent data on how children learn, and the best practices in curriculum and instruction. LATIC is gaining momentum in the Washington Township School district, and it is an expectation for all teachers to endorse LATIC lessons and foundational principles in our classrooms. As described in the 2011 edition of *Students Taking Charge* by Dr. Nancy Sulla, students experience a "felt need" for building curricular skills and concepts. They learn independently and collaboratively with classroom colleagues while using technology seamlessly as a tool for learning. They manage projects, set goals, assess progress, and identify resources for learning. There remains limited evidence to show that self-guided online methodology improves learning outcomes for most students since self-guided education relies on the responsibility, maturity, and investment of students. (Horspool, 2012). Educators, scholars, and parents express concerns regarding digital distractions and its implications on student's achievements and standardized tests.

Research Problem

If education is for the benefit, betterment, and achievement of the individual, and their future contributions to the community, how can schools maximize their technological resources for individual learners with varying levels of motivation, drive, and engagement? Technology's benefit in the classroom is determined by how it is used.

When paired with interpersonal relationships, thoughtful educators, and deliberate programs, technology can be an incredible asset.

Questions

- Are students able to identify when and how often they become off task?
- Are middle school students mature enough to self-regulate their technology usage?
- What strategies can teachers and students incorporate to limit student's technology distractions?

This study examined strategies to keep students on task while using their devices. The first step was to gather baseline data from students and teachers using two surveys. After the educator surveys were evaluated, teachers in the social studies department reported throughout the intervention which strategies minimized students' distractions best. To conclude the study, the students were surveyed about whether they thought the computer one-to-one initiative improved their learning, their motivations and strategies to limit their distractibility.

Significance of the Study

In addition to technology integration, another district mission statement is "...Continued focus on student achievement for all students, with an emphasis on closing achievement gaps, specialized student programs that reside in the least restrictive environment, and ongoing use of differentiated instruction, as evidenced through the data analysis of all standardized assessments and the creation of baseline data that can be utilized to measure District growth and improvement opportunities." With technology

incorporation, there are more options to provide students differentiation in their least restrictive environments; however, it is a challenge to gauge the effectiveness of various technologies when students misuse their devices. According to Dr. Robert Medina, neurologist and author of *Brain Rules 2013,* workplaces and schools encourage multitasking where people send email, answer their phones, Instant Message, and are on Facebook—all at the same time. His research shows your error rate goes up 50% and it takes you twice as long to do complete tasks if you are juggling too many activities at once. One of his chapters entitled "Attention" states "When you're always online you're always distracted. So, the always online organization is the always unproductive organization."

Over the course of the last two years, there have been several concerns from parents and educators regarding how to monitor student engagement on online platforms, and best practices to keep students on-task. It is a daily battle to keep students from playing games, watching videos, and messaging with their friends during instructional time. Parents also observe these behaviors at home. As a "digital native" and online learner, taking online classes in both undergraduate and graduate programs and becoming a working professional that uses computers on a daily basis, I recognize the importance of using my time efficiently but fighting the temptation to become off-task. Since using technology will be a lifelong concern for students, it is crucial that educators provide strategies to minimize distractibility during instructional time without relying on monitoring software. Students need to be cognitive and able to self-correct their own habits and behaviors in order to thrive in their futures.

Definitions

● LATIC, or *The Learner-Active, Technology-Infused Classroom*™

● SAMR (Substitution, Augmentation, Modification, and Redefinition) Model

● Learning From a Felt Need – Students are presented with meaningful, higher-order activities that create the context for learning and build a "felt need" to learn the lower-order skills.

● High Academic Standards – All students are expected to achieve at high levels utilizing the teacher, peers, and other resources to meet with success.

● Higher-Order, Open-Ended Problem-Solving – Problem-Solving activities are the focus of the learning environment, setting a context within which to learn lower-order skills.

● Student Responsibility for Learning – Students take responsibility for setting goals, scheduling time, utilizing resources, and making other decisions.

● Connected Learning – Students see learning as being connected across the disciplines, to the "real world," and to their own lives.

● Collaboration – Students engage in collaborative problem-solving on open-ended problems with peers, working independently on subtasks.

● Individual Learning Paths – Teachers differentiate instruction and assignments to meet the needs of each individual learner.

● High Social Capital – Students have strong, consistent relationships with adults in school; parents and other adults are involved as partners in the learning process.

● Technology Infusion – Technology is used as a tool and a resource to support learning and not seen as a goal unto itself.

● Global Citizenship – Students understand their role as contributors to a global society and make strides to contribute to the betterment of their world.

● Distractibility--refers to children who begin to complete an activity but then quickly lose focus due to shifting attention.

● Inattention- the *consequence* of being distracted

● Technology self-efficacy- the belief in one's ability to successfully perform a technologically sophisticated new task.

Chapter 2: Literature Review

Once the computer transformed into an affordable option for schools to enhance the educational experience for their students, many scholars and researchers reported the benefits of technology infused into education and instruction. Researchers across multiple studies all note computers have a profound impact on society, but particularly in relation to the use of computers in school education in administration, various paperwork tasks, student attitudes, experiences and knowledge acquisition (Bebell & Kay, 2010; Lawless & Pellegrino, 2007; NETP, 2010; Weston & Bain, 2010); Fitton, V. A., Ahmedani, B. K., Harold, R. D., & Shifflet, E. D. 2013.) Computers also provide for differentiation and individualized education opportunities, an approach to education that is useful for students, and practice using tools or platforms necessary in their future endeavors. Computers even provide intergenerational educational advantages where children are able to teach their parents, and sometimes their teachers about how to use technology (Tatnall, 2014). With the rapid advancement of technology, the list of advantages is ever expansive.

With these acknowledged benefits for technology-infused schools and classrooms and its seamless incorporation into our daily lives, it is difficult to believe that the infusion of technology could also present some challenges, and in some cases, negatively impact students. Some researchers (e.g. Carr, 2011) have suggested that the transformation into a digital classroom resulted in a decline in reading comprehension, which leads to students' inability to commit new information presented through technology to long-term memory. "The shift from paper to screen doesn't just change the

way we navigate a piece of writing. It also influences the degree of attention we devote to it and the depth of our immersion in it." (Carr 2011). There are further concerns about reciprocal education, or a student's ability to teach others, and collaborative work since computers return to an individually centered learning process, where the learning process is compared to a one-way street. Computer-assisted instruction or computer-based instruction emphasizes the process of targeted routines, programs, and tasks designed for the individual while limiting how students collaborate digitally (Rubia, 2014).

Research on the following topics pertaining to how technology has transformed the American education system, the definition of technology integration in classrooms, one to one computer policies, distractibility and teachers/student attitudes towards technology and education, define distractibility with technology usage, and the biological development of students will be reviewed.

Transforming American Education with Technology

In 2010, President Barack Obama initiated the National Education Technology Plan, or NETP. This five-year plan outlined a national framework for specific technology goals, whose mission was to provide all with a vision of equity, active use, and collaborative leadership to make "everywhere, all-the-time learning possible." (NETP, 2017). The plan was a rally call for all involved in American education to ensure equity of access to transformational learning experiences enabled by technology. There were five core components:

- All should embrace relevant opportunities to expand students' existing technology knowledge and empower students to use technology as a tool to prepare for entering the workforce (NETP, 2017).
- Assessment using technology measures applications of 21st-century technology skills and captures student knowledge and problem-solving abilities (NETP, 2017).
- Teachers use technology to enhance learner outcomes by preparing and connecting digital literacies through 21st-century resources including professional development and data collection tools (NETP, 2017).
- An infrastructure provides iterative access to the people, tools, and emerging resources necessary to implement a grand scale technological transformation (NETP, 2017).
- Productivity involves redesigning and transforming the landscape of how technology is used in the classroom to capitalize on the strengths of personalizing learning in a technological society (NETP, 2017).

In order to achieve these goals, educators, policymakers, administrators, and teacher preparation and professional development programs need to embed tools and resources in tandem with reinforcement from families and communities. Although there is more technology in education compared to when the NETP emerged in 2010, this increased presence of technology does not ensure equity and accessibility in learning. It does hold the power to decrease barriers so learners can access resources, experiences, planning tools, and information in a way previously unfathomable. But in Ertmer's 2005 study, he identifies a need to assist educators to know how technology can be integrated

to teach content, something the NETP does not address fully in their mission statement and goals. (Mishra & Koehler, 2006).

Technology Integration in Classrooms

According to Hew and Brush (2007), there is not a unified definition of technology integration. Keengwe, Pearson, and Smart (2009) describe technology integration as "establishing the best ways to incorporate educational technologies in the curriculum as teaching tools" (p. 333- 334). Similarly, Labbo and Place (2010) Dror (2008) contrasts this perspective and states, "a good fit between the learning and the learners is critical for success and promotes efficient and effective learning." (p. 217). According to Dror, technology-enhanced learning environments should maximize students' cognitive development through active participation rather than through presentations with technology alone. Dror identifies three processes for using technology to activate students' cognitive learning: control, challenge, and commitment. He states by gradually shifting control to the learner, teachers promote students' independence and decision-making processes for deciding when, where, and how technology is used to influence metacognitive processes, pacing of activities, and ownership of the learning process (Dror, 2008). Learning activities should require students to think, reflect, and persevere through challenging and engaging mental processes rather than through activities requiring minimal student effort (Dror, 2008).

Technology integration is defined by Fleer in a 2011 study as an "educator's use of technology to enhance instruction and to create rich environments to help each individual student develop a depth of understanding and critical thinking skills."

Computer technology in academic learning aims to help students foster opportunities and interest in content-based instruction. Since many countries accept that students need technology to thrive in their lives, schools began technology-integrated curricula designed to be developmentally appropriate to bridge young children's digital experiences at home and in school. As technology became noticeably more accessible, the International Society for Technology in Education set standards for teachers, students, and administrators to support technological competency:

- NET·S (students) provides the skills and knowledge students need to learn effectively and live productively in a digital world (ISTE, 2011).
- NET·T (teachers) provides the skills and knowledge educators need to change the way they teach, the way they work, and the way they learn in an increasingly connected global and digital society (ISTE, 2011).
- NET·A (administrators) provides the skills and knowledge school administrators and leaders need to lead and sustain a culture that supports digital-age learning, builds a vision for technology infusion, and transforms the instructional landscape (ISTE, 2011).

The rapid growth of innovative technologies creates unique learning opportunities since classroom environments are required by policy and societal pressure to adapt different levels of technology access. There is no standard, to which technology-types are included, since districts have limited budgets, differing beliefs, and accessibility. In most schools in the United States, technology integration is best defined by the presence of these devices: desktop computers, stationary computer labs, mobile laptop carts, and

portable handheld devices. (Bebell & Kay, 2010; Lawless & Pellegrino, 2007; NETP, 2010; Weston & Bain, 2010). Researchers agree that effective technology integration requires teachers to include instructional strategies which use technology as a tool to enhance the curriculum and support pedagogical practices including student-centered learning, (Earle, 2002; Li & Ni, 2010; Mishra & Koehler, 2006). However, the potential and perils of technology integration have been cited numerously. (Rakes et al., 2006 Weston & Bain, 2010, Hall, 2010).

One of the most prominent concerns is that teachers need individual guidance integrating technology within their own knowledge of technology, curriculum, district policies, and individual classroom circumstances. With the swift development of new technologies, it is a challenge for schools to consistently adapt to the digital natives' lives and modalities of learning. In fact, Reiser, (2007) noted the initial impact of technology integration on instructional practices included teachers' incorporating less-than-innovative practices for technology use such as drill and practice programs. Ertmer and Ottenbreit-Leftwich (2010) agree that these types of practices are inadequate to meet the needs of the 21st-century learners, and teachers are playing "catch-up" in a game that is rigged. Researchers have urged a rethinking of the roles of technology in young children's development, learning theories, and curricula that meet the needs of modern children, and assist educators to arise to the new challenges of technology integration., 2011; Yelland, 2011).

Technological Pedagogical Content Knowledge

A teachers' attitude towards computers correlates with their successes integrating computers in their classroom (Myers & Halpin, 2002). The purpose of this research was to design and evaluate the effectiveness of a constructivist-based in-service professional development model for schools as they are becoming more responsible for modifying the curriculum and providing teachers in service training. This was done through surveys, interviews, and classroom observations over the course of a school year, and then three years later to check in with teachers. The sample included 73 K–3 teachers from a rural school district involved in integrating the use of computers into an already existing reading program, as opposed to introducing a new curriculum. The study focused on three variables: skills from previous workshop experiences, teachers' attitudes toward the use of computers as instructional tools, and teachers' perceived and actual computer use in the classroom. The findings indicated that regardless of previous workshop experience, the constructivist-based, ongoing training strategies designed and implemented in the existing curriculum helped teachers develop more positive attitudes toward using computers, increased their planned future use of the computer applications in their classroom, and affected the teachers' transfer of the training into their own classroom. For a successful integration of computers in teaching, teachers need foundational knowledge in their content, in technology, and in the pedagogy and methodology of teaching their subject. But what is most crucial is their ability to merge these three domains. This merge is called technological pedagogical content knowledge (Harris et al., 2010).

One to One

One-to-one technology integration is the distribution of devices, so every student has access to a computer or technological resource for learning, and there has been an increase in one to one distribution since 2006. Penuel (2006) identified new technology innovations and developments, the decrease of costs, and expansion of wireless access as contributing factors to the incline of one-to-one technology initiatives. Norris, Hossain, and Soloway (2011) also believe that increased demands from student and parent access to technological instructional tools for learning as reasons for expanding one-to-one technology initiatives. During a two-year 2003-2005 study conducted by (Warschauer 2010). on one-to-one laptop integration in schools in California and Maine. Through a series of interviews with parents, teachers, and students, observations, surveys, and document reviews, Warschauer and his team created a sociocultural framework of literacy the way social and cultural environments to discover if this shapes and constrains the diverse types of texts in and out of school. He discovered five benefits for the implementation of one-to-one initiatives. These include facilitation of 21st-century learner skills, increase in student engagement, expansion of writing opportunities, enablement deep learning, and integration of technology seamlessly into instruction. Bebell and Kay (2010) examined five middle schools in Massachusetts initial one to one adoption with a laptop computer, a data projector, and wireless Internet in their classrooms. (Bebell & Kay, 2010). In preparation for this integration, classroom teachers attended professional development seminars to learn best practices for intergradation of technology in curricular planning and instruction. Over the course of the study, Bebell and Kay discovered each school differed in implementation thus had varied outcomes.

But despite observable differences among the schools, Bebell and Kay realized a teachers' role and training is an integral contributor in the transformation the use of one-to-one computing. They concluded teachers who sought uses for technology acquired new knowledge, which contributed to classroom changes using technology for authentic purposes. (Bebell & Kay, 2010).

These studies reflect the transformative power of professional development and continued support towards the respect of teachers' one-to-one integration efforts (Bebell & Kay, 2010; Sandholtz et al., 1990). Dunleavy, Dextert, and Heinecket (2007) conducted a case study on the implementation of one-to-one laptops. Through their study, they found that there were different purposes for the inclusion of technology. In some classes, computers were used for online research and access to online books; drill and practice exercises for instruction, remediation, and assessment of concepts; and online environments which supported communication through class websites for homework, assignments, and research links (Dunleavy et al., 2007).

A series of surveys, interviews, and observations done in 2003 to 2005 indicated challenges for laptop use in classroom management and maintenance of hardware issues (Dunleavy et al., 2007). Dunleavy et al. demonstrates the importance of professional development opportunities to optimize laptop integration; pointedly, administration should offer professional development focused on pedagogical capabilities of a one-to-one laptop environment to support student-centered educational practices. This professional development is needed if the Norris et al. (2011) prediction is true that, "within five years *every* child in *every* grade in *every* K- 12 classroom in America will be using a mobile learning device" (p. 25).

Technology Integration Supports and Strategies for Teachers

During the initial launch of the one-to-one initiative when each student received a school-issued computer, there were several challenges teachers faced adapting to the increased accessibility in our classrooms. Reflecting back on my experiences, I found it surprising in a 1990 article, Sandholtz identified three preliminary challenges experienced by teachers when trying to incorporate technology into their instruction. (a) classroom management changes with the integration of technology; (b) negative aspects of innovative change surface before the long-term benefits of change can be evidenced; and (c) individual teachers respond to change at different stages and different rates. Sandholtz et al. (1990) discovered through observation, teachers moved through three phases of classroom management: survival, mastery, and impact. In the survival stage, teachers struggled to control student behavior, the physical environment, technical problems, and classroom dynamics (Sandholtz et al., 1990) As teachers anticipate problems and create resolutions for technological issues, they approached the mastery stage. Keengwe et al. (2008b) suggests school administrators must create a vision for technology utilization and provide their teachers a detailed professional development program to practice effective uses of technology. Ertmer et al. (2006) investigated twenty-five educators' intrinsic and extrinsic motivators for technology integration in their classrooms. Novice and experienced educators stated professional development as the most influential extrinsic motivator, and inner drive, personal beliefs, and commitment to helping students learn strong intrinsic motivation. Ertmer et al. suggest that experienced teachers may encounter needing additional time and technical support compared to novice teachers. Ertmer further notes, many teachers lack confidence in

using technology hence its absence in a curriculum. (Moore-Hayes, 2011). Glassett and Schrum (2009) propose further research in "how and why teachers' pedagogical beliefs are formed" and how these pedagogical beliefs shape technology integration (p. 148).

Developmental and Biological Appropriateness of Technology-based Education

Although many researchers, educators, and parents advocate for technology-infused education and devote time to investigate and implement this vision, there is **controversy** surrounding the influence of technology in childhood development. Some researchers believe that the use of technologies may impede children's social, emotional, physical, and cognitive development (e.g., Armstrong & Casement, 2000; Cordes & Miller, 2000), while others believe technology provides improvements. (e.g., Clements & Sarama, 2003; Plowman & McPake, 2013; Plowman & Stephen, 2003; Yelland, 2011). Bredekamp and Copple in their 1997 study determined developmentally appropriate lessons prepared by knowledgeable adults have a role in scaffolding young children's learning, (Bredekamp & Copple, 1997; Vygotsky, 1978).

The National Science Foundation funded a qualitative study of adolescent's use of technology and its impact on a person's developmental maturation processes. There were 128 thirteen and fourteen-year-old students interviewed regarding their use of technology. It became clear students perceived technology as crucial to all aspects of their everyday lives. In particular, students demonstrated their understanding of the necessity of using technology for the improvement of their cognitive and academic skills, and the role of technology skills in their careers. Throughout the interviews, students reported a high level of technoliteracy and were proud of their technology skills. (Fitton,

V. A., Ahmedani, B. K., Harold, R. D., & Shifflet, 2013). Through the interviews, it is apparent that technology is influential in the lives of adolescents. Students spend their time online and use these technologies for communication and social interactions. (Reich, Subrahmanyam & Espinoza, 2012; Subrahmanyam & Greenfield, 2008). Their presence online provides students with an opportunity to explore developmental issues in their lives (Reich et al., 2012) such as their identity. (Subrahmanyam, Smahel, & Greenfield, 2006) Middle School age students experience physiologically (Colarusso, 1992) and emotional growth and maturation. During this period of their life, they are intensely self-focused, worry about what others think of them, and crave privacy. They are less affectionate and more moody, irritable and rude toward authority figures. This is a time of high-intensity emotion and reactivity, and they are handed tools with the world at their fingertips. (Geldard & Geldard, 2010). This study concluded that technology is an integrated aspect of modern adolescents' life, providing many opportunities socially and academically. Researchers are wary about the interdependence students have on technology and its potential for abuse.

Student Distractibility and Multitasking with Technology

As a middle school teacher, it is not unusual to witness students' multitasking behaviors (e.g., messaging with friends while watching videos) and students nonchalantly comment about their ability to equally divide their attention to many tasks. Teachers raise concerns about how this might affect student's attentional functioning, as observations indicate extensive media multitasking in everyday life may be associated with decreased attentional control.

Since technology appeared in educational settings, students exhibit struggles with multi-tasking with their devices. Calvert (1994) observed the duration of attention to computer programs versus a television program in children in kindergarten and third grade. Twenty-four children, equally distributed by grade and gender, participated in a twenty-seven minute session where they could interact with six familiar computer packages while a television program was played as a distractor task. Both age groups attended longer to the computer than to the television program. However, older children attended to the computer more than did the younger children, and there were no gender differences in the results. This study suggests educational computer software is an alternative to television and that attentional patterns are more resistant to distraction with progression of a child's development. (Geist, 2007.)

In a 2016 study by Moisala et al., 149 adolescents and young adults from the ages of 13 to 24 years old performed speech-listening and reading tasks while maintaining attention in the presence of distractor stimuli in another modality or students were asked to divide attention between two concurrent tasks. Their brain activity was measured using a functional magnetic resonance imaging (fMRI). The researchers studied the relationship between self-reported daily media multitasking, task performance (MMT) and brain activity during task performance with and without outside stimuli. The results showed that in the presence of distractor stimuli, a higher MMT score was associated with worse performance and increased brain activity in right prefrontal regions, this means that subjects were unable to perform the tasks at the desired levels, sometimes, some subjects were unable to complete up to 50% of the required tasks correctly. This suggests that daily media multitasking is associated with behavioral distractibility and increased

recruitment of brain areas involved in attentional and inhibitory control and that media multitasking in everyday life does not translate to performance benefits in multitasking. Distraction can impair productivity and increase the risk of accidents, and there is a large variability in a person's ability to maintain their focus and attention while surrounded by distractors. (Larson and Merritt, 1991; Wallace and Vodanovich, 2003).

The literature review presented in this chapter is an overview of technology integration, one-to-one technology integration, the technological, pedagogical, and content knowledge framework, and students' retention and distractibility with technology. These topics are presented to demonstrate the initial concerns for teachers under new policies to create student-centered learning environments while managing the challenges presented by technology integration. All the information presented in this chapter pertains to the study of "Student Distractibility with School-Issued Devices." Each sub-topic provides crucial background information required to understand and conduct this study. For example, the sub-section about one to one device initiatives is necessary to understand how this distribution of technology occurs, and the challenges initially faced in its legislation. It is clear from the previous research, educators' skills with technology and pedagogy are paramount when shaping a student's technological education experiences and their approach to behaviors and classroom expectations in this new age. An educator's attitudes and beliefs are tracked during surveys and interviews to gain a full understanding of how a teacher shapes and controls the external motivations, beliefs, and attitudes of students' use of technology in their school work. Since later in the study, students will track how often they become distracted using their school-issued devices, the audience and research team must understand the typical middle school

students' biological maturity and executive function skills. If we do not have a firm grasp on the limitations of a student's ability to self-correct their behaviors, the results may be misinterpreted.

Chapter 3: Methodology

Setting

Schools. This study took place in two middle schools located in Gloucester County, New Jersey. Both middle schools are in the same district. This district is one of the largest in the state of New Jersey since it is composed of one early childhood center, six elementary schools, three middle schools, and one high school. During the 2017-2018 school year, there were over 14,000 students enrolled in the school district. There are five tiers of instruction, talented and gifted, advanced, general education, in-class support, and self-contained. The district is technologically advanced and is in the second year of implementing a one to one computer initiative for all students; each student is assigned a personal Dell touch-screen computer.

According to the 2016 New Jersey Performance Report, the two middle schools that are a part of this study consisted of approximately 1139 students during the 2016-2017 school year. At middle school number one, out of their 529 students, 18% of students receive special education surveys. In middle school #2, of the 610 students enrolled, 14% of students receive special education services. Both schools have diverse student populations. In 2016, in school #1, 77.1% of the students were Caucasian, 9.1% were African American students, 6.8% were Hispanic, 3.4% were Asian and 3.5% were Pacific Islander, American Indian or Multiracial descent, and 30% are economically disadvantaged. In school #2, 81.1% of the students were Caucasian, 6.1% were African American students, 5.2% were Hispanic, 5.1% were Asian and 2.5% were Pacific Islander, American Indian or Multiracial descent, and 20% are economically

disadvantaged. (New Jersey Department of Education, 2016) (New Jersey Department of Education, 2016.)

Classroom. This study took place in five seventh and eighth-grade social studies classes. The number of students in the room varies over the course of the day, ranging from 12 to 25 students in a class period. All students are invited to participate in the study.

Participants. Initially a survey about their technology use was sent to all students at the school. After forty-four 7th and 8th grade students completed the survey, 10 students were selected for the study because they had contact with the principal investigator and demonstrated a score on the survey indicating they have a chronic problem with distractibility and realize they want to improve. Six of the students were in the eighth grade and four in seventh grade. All ten students are male. Three students are classified as Other Health Impaired, (OHI), five students were classified with a specific learning disability (SLD) and two students have 504s for anxiety and ADHD. See Table 1 for general participant data.

Research Design

Prior to the start of intervention, teachers and students were asked to complete a survey ranking a student's understanding of their distractibility while using technology. Students needed to record how often they, as a student, view other websites or interact with their social media over the course of the school day. There were also questions to identify which websites students frequent the most when students experience distraction, and which classes or time throughout the day are the most challenging to stay on task.

Once this survey was complete, the intervention continued in two phases. During phase 1 students learned how to monitor their off-task behavior during computer use and record how often they became distracted and off-task. In the second phase, students were given teacher-selected rewards to reduce target behaviors that interfered with instruction, and after a few weeks, students selected their own rewards to see if there was an increase in the desired behavior.

Procedures

Phase 1. During week one, I collected baseline data on students' on-task behavior while using computers. In addition, student academic achievement scores from their first and second marking period averages were included and assigned a point value on a four-point scale to record their academic achievements compared to their technology use habits. In addition, data was collected from teachers utilizing surveys about computer use, beliefs and opinions of the role technology in classrooms, discipline, and consequences of inappropriate technology use. These were completed during week one.

At the end of week 1, students were trained on how to self-monitor and record the number of times they were off-task during the period. The first self-monitoring system used in weeks one through three was designed for students to keep track of the frequency with which they become distracted over a class period. It was designed with one box for each class block, every day of the week, where students recorded tallies for how often they went to a different website, game, or platform not desired by their teacher. During this phase, educators used a similar set-up where they kept tallies of how many times, they noticed that the particular student was off-task while using their devices.

All progress-monitoring worksheets had a box to record tallies for the frequency of a student's distracted behavior and a place for teachers to initial verifying the accuracy of students' records. As educators prompted students during the transitions from one activity to another (completion of warm-up, moving on to guided practice) students would add a tally if they were off-task. This resulted in students understanding how often their mind wondered or if they paid attention and used their computer appropriately during the ten-minute segments. Instruction during this phase continued to follow the routines and procedures established at the beginning of the school year.

Phase 2. During the first and second phase of the study, students identified the number of times they experienced distractibility using a self-monitoring system. During weeks two and three, there were no rewards or consequences built into students' self-monitoring sheets. The second self-monitoring system introduced during week four was exactly the same as the first self-monitoring worksheet, except for the addition of a goal selected by the monitoring teacher to minimize behaviors exhibited by the students. The goal was discussed between the teacher and student but ultimately decided by the facilitating teacher. The teacher responsible for the student during a class period would sign-off at the conclusion of their time, signifying the student's self-assessment is correct to the best of their knowledge.

After the presentation of both progress-monitoring worksheets in weeks two and four, and during both introductions, the facilitating teacher explained and modeled the checklists, and students were given time to practice using the checklist while the teacher observed. At the end of the practice session, the teacher and students conference, discussing responses and questions students had about their task over the next two weeks.

Once students were familiar with the first self-monitoring system, the teacher met with all educators participating in the study, to review the students' self-monitoring sheets, and to go over their role as educators.

Phase 3. In the fifth week, students selected their own rewards and consequences to continue during the duration of the study. The student-selected rewards were added during week seven and continued into week eight. Throughout the entire study, students continued using the self-monitoring systems, but additional data was collected using a teacher scale, reporting academic progress and behaviors in class. To conclude each phase, students completed a survey to report their beliefs about their self-monitoring systems, rewards, and consequences and any progress they believed they achieved.

During week four and week eight, educators completed a survey to report any noticeable changes in the student's behaviors using computers, and academic performance as a consequence. Concluding Week 4 and 8 teachers also discussed which classroom structures and routines they believe best-assisted students to minimize their computer distractibility and recorded their observations and actions through individual surveys. This was compared to what students recorded on their self-monitoring sheets. All of their grades over the third and fourth marking period were recorded and considered with the teacher and student feedback.

Materials

Throughout the study, students' off-task behavior while experiencing distractibility with their computers was measured by the monitoring teacher using a teacher scale and students kept track on self-monitoring sheets. On the teacher rubric, students were scored on a four-point scale. A score of 1 indicated the student was not on task and/or not focused on classwork and allowed the computer to distract them. Student examples include student's eyes fixated on their computer monitor, reacting to something in the game, or what they were viewing on their screen while not completing their course work, and required prompting to get back on the task at least twice. A score of 2 indicated the student was not on task due to the computer and needed prompting from outside sources at least once. A score of 3 indicated the student was able to self-correct their own behavior over the observation period. A score of 4 is given to students if they do not deviate from their classwork until their work is completed.

- Standardized Interview Questions for educators and students during week 4 and 8
- Self-monitoring sheet with teacher-selected rewards (used during week 4 and 5)
- Self-monitoring sheet with student-selected rewards (used during week 6 and 7)
- Survey to begin and conclude the research project. (Used during week 1 and 8)

Students had several materials for their self-monitoring. There was a handout to monitor attention paid to classes, where students recorded how often they became off-task, and in week four, how they self-corrected their own behaviors.

- Monitoring Chart #1 Students
- Monitoring Chart Educators

- Student Self-Monitoring Chart #2

Variables

The dependent variables for this study included off-task behavior, student academic achievement and the student survey. Academic achievement was measured by grading students' independent work, and standardized assessments monitored academic achievement. Students were given a score of 1-4 for independent work using the computer. Students received a 4 if all elements of the assignment were completed correctly. Students received a 2 if 50% of items were completed correctly and students received a 1 if less than 50% of the items were completed correctly. The surveys given to students recorded their perception and understanding of their distractibility, and if it is a concern for them. The independent variables in this study were student self-recording of distractibility during computer use and the use of two types of reinforcement.

Data-Analysis

Survey results pre and post-intervention were collected and presented in a table. The data of the two variables, on task and students grades from each phase, were displayed in a table. Moreover, results from each phase were compared and converted into graphs for visual analysis. This comparison of results helped to determine the effectiveness of self-monitoring, and reward systems to minimize student distractibility with their school-issued devices.

Chapter 4: Results

Over the course of an eight-week study, students were asked to self-monitor their interactions with their school-issued devices, while completing a self-monitoring sheet. Teachers were interviewed along the way to discuss the progress of these students, and what strategies teachers implemented to limit computer distractibility. During weeks 6 and 7 of the study, students selected their own rewards that were a part of the behavior plan for their grade level and teams, and during week 8 the ten students concluded this study with an exit survey ranking their progress with their distractibility.

The research questions to be answered were: Are students making educational gains through the one to one computer initiative? Are students able to identify when and how often they become off task? Are middle school students mature enough to self-regulate their technology usage? What strategies can teachers incorporate to limit students' technology distractions?

Students who chronically struggled with their computer usage were selected for participation in this study by their core subject teachers. By the end of week one, I had collected baseline data on students' on-task behavior while using computers through surveys completed by each of their teachers. In addition, student academic achievement scores from their first and second marking period final scores were included and assigned a point value on a four-point scale. The scale is: 4 pts.-Principal's List in all classes (Mathematics, Science, Social Studies, ELA and all electives), 3 pts.-All As in all core subjects (Mathematics, Science, Social Studies, and ELA), 2 pts.-Honor Roll for marking

periods one and two, 1 pt.-passing all classes with 70% (D+), 0 pts.-Failing multiple core subjects.

Table 1: General Participant Data

Student	Age	Grade	Classification	4 pt. Scale Grades	4 pt. Scale behaviors with Computers Week 1
A	12 years old	Seventh Grade	SLD	4	2
B	12 years old	Seventh Grade	SLD	4	2
C	13 years old	Seventh Grade	SLD	2	1
D	14 years old	Eighth Grade	504-Anxiety/ADHD	3	1
E	13 (Will be 14 by the end of this study.)	Eighth Grade	SLD	1	1
F	13 (Will be 14 by the end of this study.)	Eighth Grade	504-Anxiety/ADHD, and receives speech services for stuttering.	0	2

Student	Age	Grade	Classification	4 pt. Scale Grades	4 pt. Scale behaviors with Computers Week 1
G	13 years old	Eighth Grade	OHI	0	1
H	14 years old	Eighth Grade	OHI	0	1
I	13 (Will be 14 by the end of this study.)	Eighth Grade	OHI	2	2
J	13 years old	Seventh Grade	SLD	2	2

Table 1. General Participant Data (continued)

All of the students involved in the study were rated as "highly concerning" with their technology use from each of their core subject teachers. The science and social studies teachers for students G and H, started to provide paper copies of all of their assignments because the teachers believed they could not be trusted to handle the computers appropriately but allowed these two students another chance for the duration of this study.

Educators were asked to record their perspective on students' academic achievement and beliefs about their technology use through a survey. Eighteen educators

answered questions about computer use, beliefs and opinions of the role technology in classrooms, discipline, and consequences of inappropriate technology use. During the survey, teachers were asked what are the challenges you face as an educator since going one-to-one? Out of the eighteen educators, fifteen reported challenges with the behavioral component and impulse control for students to use the computers for the intended purposes. Teachers also listed concerns with the computer chargers and not coming to class prepared with their computers charged or losing their chargers. Finally, another concern that teachers listed was that students did not understand the responsibility of how to maintain their computers. They reported that students downloaded games, slammed computers on surfaces, and pulled out batteries. The educators listed the advantages of the computers as: exposure to technology needed for success in students' future endeavors; quicker assessment method; and more opportunities to enhance the curriculum (virtual field trips, web-based activities and platforms). All teachers reported there were no rewards for students' appropriate use of technology, but listed the behavioral consequences outlined in the district student handbook.

Group Results from the General Student Survey

Figure 1 shows how often students believed they used their computers in class. The majority of students used their computers about six class periods a day, or just under six hours.

Figure 1. Student Computer Use.

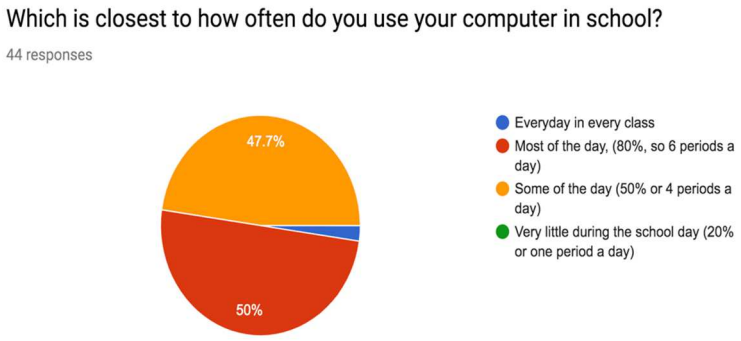
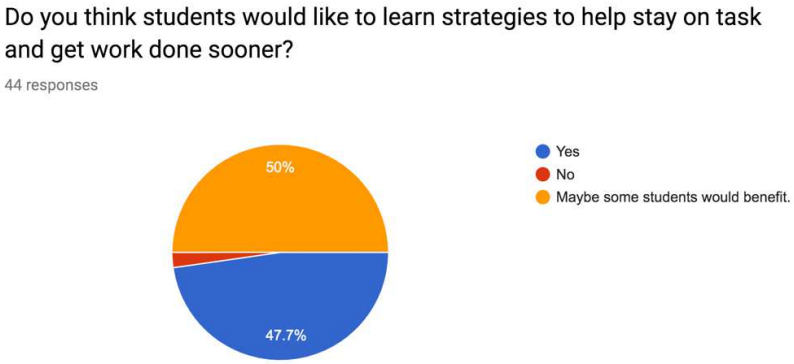


Figure 2. Strategies for computer use.



In Figure 2, students were asked if they believe as seventh and eighth graders, their peers would like to learn strategies to end their distractedness while using the computers. 47.7% of students polled believe other students would like to learn strategies to stay on task.

Figure 3. Coachability.

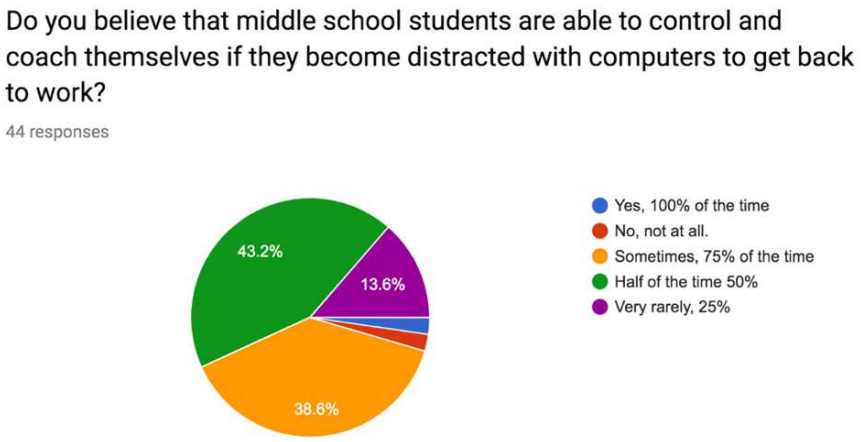
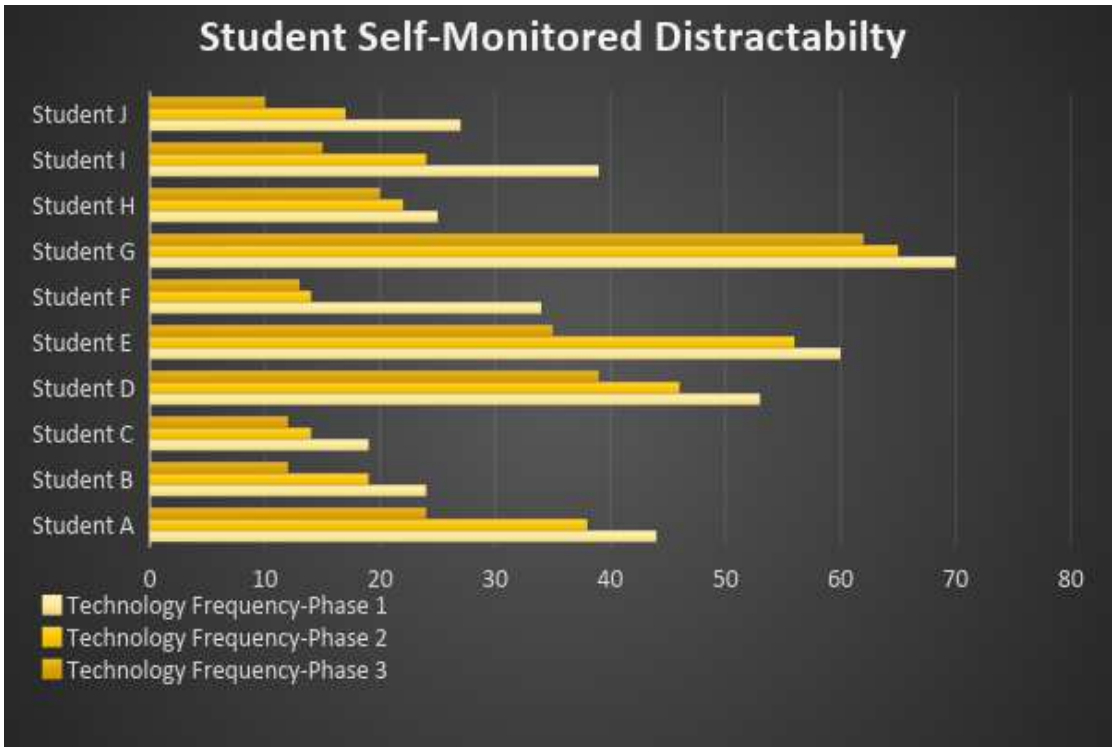


Figure 3 shows what students believed about the coachability of other students to understand they are distracted and get back on task. The majority of students reported that they believe that students are able to stop their distraction about half of the time.

Figure 4. Student Self-Monitored Distractibility.



Over the course of the study, the ten students tracked the frequency of their distractibility in each of their classes. Figure 4 shows the number of instances during each two-week long phase students reported deviating from their six classes to use their computers for other purposes. The range of distractibility varied in the initial weeks during phase one of the study. During this first phase, student G reported becoming distracted 70 times in class, which was the highest reported number. Student C reported the least amount of distraction during this first phase-19 times. Some of the goals created with students and teachers were to decrease the frequency in science and social studies by five times a week. Another goal for a student was to pay attention to their mathematics platform, Digits, for ten minutes using a timer, and then take a break, hoping this would decrease their distractions in their worse class. The student increased their time by four

minutes over the course of the study and met their goal. The rewards students first were able to choose from were awards built into the behavioral plans in their classrooms. These included sitting in a comfy chair, extra credit, delay the due date of homework, and be the teacher assistant for the day. If a student met their goal, they earned a reward, and each student made measurable progress, but not all students made their goals. During the final phase, students selected their own awards, and some parents were really supportive of rewarding their students at home. When students selected their own rewards, some chose rewards that could not be provided in schools, such as video games, a trip to Ulta, dinner at Nifty Fifty's, or other items, and the parents stated they would follow through if their student met their goals. Students B, C, and F were rewarded by their parents since they decreased their distractions and met their goals over the course of the study. Student J, I, and E also met their goals, but they were motivated to get better grades, and selected downtime with their computers as their reward, and to listen to their music when they were done. The other four students made progress but did not reach their goals.

Students reported in their exit survey the classes they were most likely to become distracted are in ELA and Science, with Social Studies closely behind these classes. Some of the reasons stated by students were when students were assigned an essay, during their research phase of writing, they are instead on websites such as Instagram, Twitter, Youtube, and coolmathgames.com. They also reported that these classes are structured in such a way where they are trusted with their computers, and so they believe they can "get away with more." In this final survey, students were asked how the teacher selected/student selected rewards motived them, and students responded, "I wasn't very motivated by the school rewards, my Mom told me I'd get Call of Duty or I would be

grounded." (Student C), "I was not motivated when you selected by reward, but I would be motivated if I had a few minutes of downtime with my computer at the end of the period when I get my work done." (Student J) "I know I have a problem with the computer, I don't care enough to fix it." (Student G) When they were asked if they thought other students would be able to stop going to other websites, the majority, 6/10 do not believe other students will be able to stop going on other websites while using their computers. When teachers were asked about observable progress, and what we could do to minimize distractions, there were not many solutions offered. Some teachers stated we should not use the computers as often for classwork and go back to paper and pencil. Others want the district to pay for a monitoring system, and others believe there is nothing that can be done, except to have stricter behavioral expectations and everyone follows through.

Chapter 5: Discussion

Review

This study examined the effects of student self-monitoring of their computer usage during a one-to-one computer district-wide distribution program on students with special needs. This study was conducted in a suburban community middle school in southern New Jersey. The ten participants in the study were students who were eligible for special education services under the categories of Specific Learning Disabilities, Other Health Impaired, and ADHD. All ten of the participants were selected for this study because their teachers saw their distractibility as "high-risk" and were asked to track their internet habits over the course of the eight-week study.

Expectations for the study were that students would decrease their frequency of computer distractibility as the teachers in the study decided which teaching strategies were most effective. All of the participants decreased their frequency of going to other websites during class time, in all phases of the study, which also positively impacted their grades. Each student made positive gains in their self-monitoring. Three of the participants (Students A, B, F and I) made larger gains, 46%, 50%, 38%, and 38%. In order to make their gains, these students used a modified version of the Pomodoro technique, a technique which uses a timer to break down work into smaller intervals, separated by short breaks. These students selected during their second and third phase of the study to have downtime with their computers. Over the course of a fifty-minute period, students would either work 35 minutes, and break for 15, or work for 40 minutes,

and take a 10-minute break. This was the most successful reward and technique of the course of this study.

The students who had the lowest gains were students G, H, and D. These three students decreased their reported distraction frequencies by 32%, 29%, and 12%. Throughout the phases, as students self-monitored and tracked their own data, a student's motivation to succeed and improve their scores was a major contributing factor to predict their success during this study.

The most successful student, Student B, was both intrinsically and externally motivated to do well in this study. This student progressed because of the ten minutes of free computer use at the end of a fifty-minute period, classroom incentives, and support from home. Student B wants to apply to a regional technical school next year and realized their grades will decide their enrollment into their program. The parents of Student B also provided incentive through milestone rewards. For example, when the computer distractions were minimized by 25%, this student was taken to their favorite restaurant for a meal. When the study finished, the parents took Student B their favorite store to pick out a few items. Student B reported the importance of their drive to succeed from their goals, parents, and classroom rewards to transform their computer habits. Student B's marking period averages increased by 3-4 points in all classes, which further motivated this student to continue monitoring and self-correcting their distractions on the computer.

On the other hand, Student D's lack of motivation led to their minimal improved gains at the conclusion of the study. During the exit survey, Student D, who decreased

their computer distractions by 12% stated he was surprised he experienced as much distractibility as he did, but he did not care if his grades were low, nor did any of the rewards that were offered through behavior systems in classrooms (sitting in the comfy chair, listening to music in class, becoming the assistant teacher for the day,) inspire any change. Student D does not have a strong support system at home, so further incentives were not offered for the improved desired computer habits.

Comparison to Previous Research

One-to-one technology integration is the distribution of devices by a school district ensuring every student has access to a computer for learning. Following a series of interviews with parents, teachers, and students, educators, Bebell & Kay (2010) concluded that parents and teachers have a crucial role in the success of student technology use in their classrooms. In preparation for their studies' integration, classroom teachers attended professional development seminars to learn best practices for integration of technology in curricular planning and instruction. Over the course of the study, Bebell and Kay discovered each school involved in their study differed in implementation which varied their outcomes. They concluded teachers who sought uses for technology acquired new knowledge, which contributed to classroom changes using technology for authentic purposes. (Bebell & Kay, 2010).

When this study surveyed educators about students' use of technology, 100% of teachers polled believe they are trained proficiently in the digital platforms and resources needed for their content areas. 16/18 teachers or 88% of educators polled stated they are underprepared for the behaviors and classroom management associated with student

devices. Educators recognize the role professional development would have in these concerns, and all educators surveyed would like further guidance and the creation of specific policies for disciplinary actions when students misuse their school device. Norris et al. (2011) predicted "within five years *every* child in *every* grade in *every* K- 12 classroom in America will be using a mobile learning device" (p. 25). This is certainly true in the district focused in this study. In a 1990 article, Sandholtz identified three preliminary challenges experienced by teachers when trying to incorporate technology into their instruction. (a) classroom management changes with the integration of technology; (b) negative aspects of innovative change surface before the long-term benefits of change can be evidenced; and (c) individual teachers respond to change at different stages and different rates. Teachers move through three phases of classroom management: survival, mastery, and impact. As teachers anticipate problems and create resolutions for technological issues, they are considered masters. The majority of educators surveyed are masters of technology skills, and according to the survey, believe the technology concerns they have, are in the hands of administration.

The National Science Foundation funded a qualitative study of adolescents use of technology and its impact on a person's developmental maturation processes. It was clear through their study that students perceived technology as crucial to all aspects of their everyday lives. In particular, students demonstrated their understanding of the necessity of using technology for the improvement of their academic skills, and the role of technology skills in their careers. This was noticed in the current study when 97% of all students surveyed believe their district-issued computers positively support their education. Through student interviews and surveys, it is apparent that technology is

vastly influential in the lives of adolescents, and students spend most of their time online and use these technologies for communication and social interactions. (Reich, Subrahmanyam & Espinoza, 2012; Subrahmanyam & Greenfield, 2008).

During this current study, Student Distractibility with School Issued Computers, students demonstrated dependence on their school-issued technology and the device's potential for abuse is similarly documented in multiple studies. (Subrahmanyam, Smahel, & Greenfield, 2006). (Reich et al., 2012). This was reinforced during my research through student surveys when Instagram, TicToc, and Twitter were listed as the most visited websites by students when they exhibit inattentiveness to their classwork. Students also reported spending over four hours on internet capable devices at home to communicate with their friends.

In a 2016 study by Moisala et al., 149 adolescents and young adults from the ages of 13 to 24 years old were asked to divide attention between two concurrent tasks. The results showed that in the presence of distractor stimuli, a higher manual muscle testing, or the maximum force the brain is capable of generating, score was associated with worse performance and increased brain activity in right prefrontal regions, which means that subjects were unable to perform the tasks at the desired levels. Some subjects were unable to complete up to 50% of the required tasks correctly. (Larson and Merritt, 1991; Wallace and Vodanovich, 2003).

Both previous studies and the current study found that if a student is scrolling through their Instagram, listening to a video and answering comprehension questions on the video, their work performance will be lower. This is a noticeable phenomenon in our

district, and many students believe they are able to multitask, and manage multiple assignments at once, but previous studies and this one all conclude this is not possible. Participating teachers listed concerns about how student's devices affect their attention since educators watch students attempt multitasking which leads to decreased attentional control and lower grades.

In the current study, 80% of the students who participated in this study improved their grades for the third marking period by an average of 3 points compared to their grades when the study began. Since students tracked their computer and multitasking habits, and realized a change is necessary, often did not try to complete multiple tasks at once and took their breaks for their down time at the end of a class period.

Practical Implications

The participants in this study experienced an intervention with self-monitoring to reduce their computer distractions. Most students experienced success in actively changing their computer usage, which increased their grades and attention to their classwork. Students became conscious of their mind wandering from their assigned work through self-monitoring and graphing their progress as they were encouraged to "best themselves" and take ownership of their progress. The monitoring, rewards, and motivation led to less distraction and improved grades. Educators should consider building in "break periods" for students to use their computers based on their personal interests since students were unable to consistently regulate their own behavior when trying to balance their classwork and personal interests.

Future Studies

Future research should study the effectiveness of variations of the "break period" in tandem with students self-monitoring their computer usage until monitoring software or better blocking programs are in place on their devices. Many, if not all, students struggle with tuning out internet distractions, so future studies should also consider how best to motivate students without relying on software or programming. Future studies could track students over the course of their school careers as students learn this life-long skill to combat their impulses in their computer classes. In order to increase the sample size, these interventions may be carried out across a class, school, or district-wide setting and embedded into the curriculum with control groups of students provided curriculum-based strategies, and students who were just subjected to monitoring software.

Conclusion

To conclude, educators recognize the social need for computers in classrooms, but the majority do not know if students are progressing in their education as students did before the one-to-one computer initiative. Educators are unable to control how students use their computers and would prefer a monitoring system and stricter disciplinary code to minimize undesired behaviors. Students are able to identify when and track how often they become off task. Students were able to diminish their distractions, but not completely eliminate them.

This study sought to determine (a) if students are able to identify when and how often they become off task while using computers, (b) if middle school aged students are mature enough to self-regulate their technology use, and (c) which strategies teachers

could incorporate to limit student's technology distractions. The results showed that, for all participants in this study, the frequency of distractibility did result in a decrease in distractibility and a few students improved their grades. It was determined from student feedback that all students were not aware of how often they deviated from their classwork, and most gained motivation through classroom rewards, but reinforced rewards from home were most successful. Combining the reward system and tracking proved powerful for this group of special needs children and it would stand to reason that it could be beneficial for other students struggling with their technology. Students may need to be taught specific strategies, with guided practice and teacher monitoring until students are routinely able to monitor their own behavior. Implementation of these interventions are more cost-effective than monitoring software, and students will gain a helpful skill needed for the rest of their lives.

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Appendix

Appendix A First Phase Self-Monitoring Sheet

Please place tally marks in the corresponding box each time you go on a different website or play a game during class time.

Class	Friday-3/5	Monday 3/8	Tuesday 3/9	Wednesday-3/10	Thursday 3/11	Friday 3/12
Social Studies						
ELA						
Math						
Science						
Foreign Language						

By initialing below, as the educator, I verify to the best of my ability, the frequency of the self-monitoring of _____'s computer use is correct.

Social Studies	
ELA	
Math	
Science	
Foreign Language	

Appendix B Second/Third Phase Self-Monitoring Sheet

Please place tally marks in the corresponding box each time you go on a different website or play a game during class time.

Class	Friday-3/5	Monday 3/8	Tuesday 3/9	Wednesday-3/10	Thursday 3/11	Friday 3/12
Social Studies						
ELA						
Math						
Science						
Foreign Language						

My goal is to:

By initialing below, as the educator, I verify to the best of my ability, the frequency of the self-monitoring of _____'s computer use is correct.

	Total number in each class this week:
Social Studies	
ELA	
Math	
Science	
Foreign Language	