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The Use of 1:1 Technology to Motivate and Engage Students

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THE USE OF 1:1 TECHNOLOGY TO MOTIVATE AND ENGAGE STUDENTS

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Abstract

Growth of technology in the past decade has changed the educational system forever. Technology has been integrated into education to incorporate new tools for students to connect with the outside world. Students now have the opportunity to learn content in any way, anywhere, and anyhow they feel comfortable. In recent years, many school districts have rewritten their goals to include 1:1 device implementation and student-centered, personalized learning models. This thesis serves as a practical guide for implementation and pedagogy to maximize 1:1 technology implementation. The 21st century will boast jobs that can't even be imagined currently. Preparing students with soft skills and dreams of following their passions, will create the most successful, employable, young adults. This can only happen with increased student engagement and student-centered classrooms. The following research concludes that 1:1 devices themselves don't engage and motivate students within the content they are learning, but instead, the shift from traditional classrooms to student-centered learning that occurs through the use of the devices, captures students.

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CHAPTER 1: INTRODUCTION

Developing Skills

Education is perpetually evolving. As important as a teacher's passion for content, teachers are now required to become more than just masters of their trade. They now must also teach 21st century skills to students. Education must prepare students for jobs that don't exist yet. Technology progressing into the work field is revolutionizing industries and it is increasingly becoming a teacher's role to motivate and engage students in a way that allows for a realization of potential within a student's field of choice. The question of whether 1:1 devices are the best way to get students excited about the future will be reviewed in the following research. By examining motivation and engagement with devices and correlating test scores and positive impacts on students in their studies, conclusions will be generated on the impact 1:1 device implementation has.

Teachers must hear students' questions and concerns, then provide a vision for each student to be successful in the future. A difficulty lies in the learning of new skills necessary for 21st century careers. Teachers need to teach students to collaborate, self-advocate, and utilize soft skills to be successful employees. For this reason, traditional classrooms have changed. With 1:1 device implementation in educational settings, the focus moves from the teacher as a lecturer to a facilitator seeking solutions to real-world problems. However, research still debates whether or not this change is in students' best interest. This literature aims to determine if 1:1 devices are a worthwhile tool for educators to integrate, and if they have the potential to re-mold philosophies and preconceptions about the classroom. Pedagogy, and what was previously viewed as best practice, will face a shift in the educational process. Multiple positive studies must be presented to develop those mindset changes. This thesis is an opportunity to sharpen

ideas and discover how 1:1 is affecting students. An understanding of how we can support our students and their use of devices in revolutionary ways is also included.

History of 1:1

"One-to-one (1:1) computing refers to a learning environment where students and teachers have access to a personal computing device to use as a tool for academic learning" (Varier et al., 2017, p. 967). Many schools allow the devices the district provides to be taken home, and subsequently, anywhere in the world. Students are able to download files to work from home as well, even if no internet is present. Where devices have had the biggest impact thus far is with delivery of instructional content. Teachers are able to record lectures and allow students to watch them at their own pace. Instead of daydreaming or losing focus while the teacher is in front of the room, a student can now hit the pause button and resume content they otherwise would have missed.

The researcher experienced a high school setting where it was against the rules to have a cell phone out in class and the computer lab was only utilized when needing to type something. Teachers also aligned the desks in rows with the teacher's desk at the front of the room (Unruh, Peters, & Willis, 2016). As we have developed, cell phones have been replaced with other mobile devices. Studies have shown that in the last five years there has been an increased number of articles written around the world about mobile learning (Baran, 2014). Some people view 1:1 environment as a distraction claiming social media and games will be an interference for learners, however classroom management can retain the individual learner (Andersson, Hatakka, Gronlund & Wiklund, 2014). Niderhauser and Stoddart (2001) showed on computers that students could do better than right or wrong answers and that they needed to be able to represent knowledge on their own. Research shows that as students' attempt to show us in

different ways that they know content, we find ourselves teaching them skills that they are going to need to be successful in the 21st century (Varier et al., 2017).

Classroom Transformation

Not every 1:1 classroom is the same. Teachers are consistently trying new ideas to fit their needs. The most recent turn has been to blended classrooms, where there is a mixture of traditional methods and new pedagogy and instructional tactics. Blended classrooms, or hybrid classrooms, have not yet been supported by large amounts of research, but as more and more appear to be effective across the country, people are recognizing these classroom approaches may best reach students. One type of classroom is the Flipped Classroom model, where students meet at a traditional time with the instructor, but that time isn't used for lecture. Students are responsible for watching lecture ahead of time, so that class can be used for questions, activities, and deeper depth of knowledge questions. One of the main advantages was that students had the freedom to learn at their own pace (Delialioğlu, 2012). The major benefit of the flipped classroom includes the increase in the level of individualized instruction (Unruh et al., 2016). Continued research on this topic is important. Devices in the classroom have led to many pedagogy and instructional practice changes. Some technology rich projects allow individualized learning opportunities for students within one classroom (Downes & Bishop, 2015). Individualized learning, flipped classroom, and other pedagogy ideas are going to be discussed. This research is a wonderful beginning for ideas as you embark on your journey through 1:1. As the world continues to change, so will the best educational practices. Being flexible and having an open mindset, will transform a classroom to "fit" what students should expect as they leave the building.

Thesis Aim and Guiding Question

Knowing the context of 1:1 implementation, it is possible to examine how access to technology is changing education. The aim of the thesis is to determine whether or not a 1:1 model benefits most students and their overall success in the classroom. Many examples of implementation, pedagogy, and different levels of student impact were examined. There has to exist a model that could be successfully incorporated in our educational system. While not much history for blended and flipped classrooms is available, the history of traditional models does show that a one-size fits all model doesn't apply. That being said, standing in front of the classroom and lecturing is a teaching practice that is fading fast, with alternate methods of content delivery being established. Face-to-face or teacher to individual student meetings is now possible in the classroom due to the additional class time (Kostaris, Sergis, Sampson, Giannakos, & Pelliccione, 2017). This new pedagogy likely outweighs the negatives associated with moving to 1:1 implementation in the classroom. Change is always difficult, as preconceptions and mindset along with the initial costs of purchasing devices, create some hesitation about moving forward with 1:1. This research defends how students need to be prepared for the 21st century when they leave today's classrooms. The guiding question throughout the research was as follows: Is there an increase in motivation and engagement in schools with 1:1 technologies? For the purpose of this thesis, success will be measured by schools continuing to move towards 1:1 education and student-centered learning.

CHAPTER II: LITERATURE REVIEW

Chapter Two reviews the published literature on 1:1 classrooms, discussing the mindset change, examining implementation, diving into student impact, and noticing a shift in pedagogy. The impact 1:1 implementation has in the classroom, as well as its ability to take learning outside of the classroom walls, cannot be ignored. This information goes beyond how 1:1 implementation will bring about student success, but also examines ways to help teachers reach maximum learning potential. The literature used in this article was located through searches on Academic Search Premier and EBSCO host with publication dates of 2001-2018. These searches were narrowed using the following keywords, "engagement in 1:1 secondary schools," "motivations in 1:1 schools," and "1:1 engagement in education."

Benefits of 1:1

1:1 technology in a classroom allows teachers to utilize many different instructional strategies and gives students additional ownership over their learning that was previously not seen in the traditional classroom setting. Student-centered learning is more evident in 1:1 classrooms. As the transition is made out of classrooms where teachers' are lecturing and into a world increased by laboratory experience and activity-based learning, we must increase access to a global education by equipping students with a device. There are four main areas to discuss when talking about 1:1 in the classroom. Mindset changes for teachers and students must take place to allow for maximum learning in the classroom. A district's implementation needs to be one of support for all individuals involved, including teachers and students (Vu, Fredrickson, & Gaskill, 2018). Discussion must occur around the student impact as the transition is made: What are the beliefs and motivation towards these devices and are they improving achievement? Finally, the growing shift in pedagogy must be analyzed, as there tends to be transitions with

educators continuing to become innovative and try varying methods of utilizing devices, including flipped classroom models (Harper & Millman, 2016).

Mindset

Teachers and students who struggle to invite change into their lives will never discover the best way to become lifelong learners. By developing new philosophies and eliminating their preconceptions, they can discover potentially new and more efficient ways in education.

Preconceptions. If the goal of implementation is to have increased engagement and motivation through the use of 1:1 devices, then we need to maximize their potential. The use of technology when it began was questionable. It seemed like a great idea, but teachers and districts had to learn how to use it on the fly. The preconception and classroom philosophy were ever changing. It was crucial for educators to become lifelong learners to incorporate new, technology rich instructional tasks and ideas into their classroom. Several researchers studied early mindset for educators. The thought of working on computers began many years ago, when specific software was still required. Niederhauser and Stoddart (2001) completed research on teachers' instructional perspectives and the use of educational software. The guided question was to examine relationships between the type of software used in the classroom and use of technology in instruction. They sent a questionnaire to 418 elementary schools in a western state. A total of 1,093 surveys were completed by teachers who had an average of 12.2 years of teaching experience. Software was considered skill based or open ended. A skill based software example would be a game teaching how to type. Open ended software, like Powerpoint, could be used to design a presentation for peers. Nidererhauser and Stoddart (2001) showed data comparing skill-based and open-ended software use. Also 85% of teachers were using skill-based software alone or in combination with open-ended software. Today, this might be

considered holding students back. Those perspectives limited how computers were getting integrated into instructional practices. Research calls for more professional development and trainings so teachers change pedagogy practices which incorporate exploration.

Ruthven, Hennessy, and Brindle (2014) went a little further, finding some reasons to promote technology in the classroom. Discovery was made into what attributes technology brought to the classroom, and how technology could enhance education. Ruthven et al. (2004) investigated teacher professional thinking about how technology should be used in mainstream classroom practices. They focused on different ideas which provided the framework for how computer-based tools and resources were being used in core subjects at the secondary level. The authors were looking for what was deemed successful, but also understood how teachers' opinions of success could vary and be challenged on a case by case basis. The analysis demonstrates there were seven major contributions of technology use in teaching and learning: increased speed and efficiency of routine processes, improved processes of checking, fixing, and redrafting work, enhanced variety and appeal of classroom procedures, fostered pupil independence and peer support, improved perseverance through mistakes and enhanced ownership, increased accuracy of information, and growth of organizational skills. Of these, three stick out: growth in motivation towards school work, more efficient scholastic processes and outcomes, and promotion of student independence and collaborative work (Ruthven et al., 2004). These three outcomes are monumental when considering the appeal of 1:1 devices now. Technology implementation provides an opportunity to have student-centered learning. These articles were way ahead of their time when it came to technology and the mindset it could create.

Not only was teacher mindset reviewed, but also preconceptions for students as well. Barkatsas, Kasimatis, and Gialamas (2009) wanted to investigate students' mathematics and

technology confidence, their technological, behavioral, and affective connection to learning mathematics, and mathematics achievement by gender and year. The research was trying to find a connection looked between all of these student dynamics. Barkatsas et al. (2009) used 1,068 secondary school participants from 27 different schools who were randomly selected. A weakness of this research is location, as it was completed in the Metropolitan area of Athens, Greece, but because of the large sample size and variety of socio-economic statuses represented, the results could apply to other geographical areas. Barkatsas et al. (2009) discovered that boys expressed more positive views towards mathematics, and the use of technology in mathematics, than girls. The primary conclusion of the research is that students who display strong mathematical skills, but struggle using a computer, are willing to learn mathematics using a computer. One can conclude that students are willing to make gains learning to utilize computers while they are learning mathematics as an attempt to learn two things at once. This growth mindset develops when the ability to learn two things at once is what motivates students. The early mindset indicated change could lead to technology becoming evident in all classroom.

Philosophy. Showing the importance of technology and how it could shift mindset for students and classrooms was not always enough early on. However, having teachers who wanted to participate in the technology was crucial to its success. Hermans, Tondeur, van Braak, and Valcke's (2008) measured the impact of primary school teacher beliefs on the classroom use of computers. The size of the research was 525 teachers from 68 schools in the Dutch part of Belgium. They researched variables such as age (22 to 64), gender (81% female, 19% male), computer experience, and beliefs towards computers, and discovered which variable had the largest impact on computer use within the classroom setting. The hypothesis was that teacher belief would be the most important factor in whether technology was implemented or not. It was

determined that traditional classroom beliefs have a direct correlation towards the classroom use of computers. The importance of 1:1 teacher pre-service training, professional development, and the ability to construct new beliefs was supported by Hermans et al. (2008).

This was not only a problem in 2008, as Paraskeva, Bouta, and Papagianni (2016) were published in Science Direct. They examined and looked at computers and education; more importantly, how secondary school teachers' ability with technology lead to the success of technology integration. The purpose was to determine if there was a connection of computer self-efficacy with: self-esteem, general self-efficacy of secondary teachers; demographics of teacher, curriculum, or prior experience with computers. The participants were 286 secondary education teachers, who attended a training program about learning and instruction. There is a direct correlation between general self-efficacy and teacher computer self-efficacy, meaning the higher general self-efficacy, the higher computer self-efficacy. Statistical evaluations conclude that instruction for teachers which enhances their ability to use computers in the classroom to a point where they are confident is critical to the success of technology integration (Paraskeva, 2016). In today's words, teachers new to be confident with 1:1 devices to implement into their classroom.

If we are going to develop teacher confidence with technology, then teacher support must be provided. As teachers and districts rode through this new wave, supporting each other was critical to success. Mouza (2011) additionally investigated two questions on how professional development centers on case development: Does it influence teachers to create delivery methods that promote technology, content, and pedagogy? Does it promote practices that need to be developed to learn from implementation of technology? The participants were eight teachers from three urban charter schools that focus on case development of technological and pedagogical content knowledge. The researchers uncovered that when teachers were unlikely to

use technology, it was due to a lack of support and resources from the school. Mouza (2011) states the most relevant thing teachers can do is document their own classroom teaching so they can learn through their own explorations and considerations when incorporating technology.

Implementation

Implementation resulted in increased effective teaching, strong support, and changing students individual development. Questions regarding the reason teachers saw success being 1:1 devices or teacher built relationships and classroom management were examined. Also, when implementation occurred, districts needed to identify how they were going to support teachers. Teachers needed support with professional development and infrastructure (Shapley, Sheehan, Maloney & Caranikas-Walker, 2011). Individual development focused on student feedback and how that provided the opportunity to create a personalized learning path for each student.

Effective Teaching. Students tend to build relationships with teachers, and it often ends in increased student engagement. However, a student attempted to show that engagement cannot be compared with teachers or technology. Gebre, Saroyan, and Bracewell (2012) had two purposes for their research: to measure how well students engage with the use of technology in the classroom as well as to determine that engagement is related to professor approaches and strategies for teaching. The research was conducted at a large research-intensive university in Eastern Canada. Gebre et al. (2012) used 232 students who were taking classes taught by 13 professors scheduled to teach in the two active learning classrooms. It strived to define the quantity of student engagement present in technology rich environments, as well as eliminate the notion that student engagement directly relates to the professor's ability to be an effective educator. The first contribution was that in successful technology rich classrooms, there are four components: cognitive and applied engagement, social engagement, reflective engagement, and

goal clarity. The second contribution is that professors need a better idea of what effective teaching actually looks like. The weakness of this research is that it does not make a connection between the level of engagement and academic achievement. If technology rich classrooms cannot be the main idea behind engagement, then neither can professors (Gebre et al., 2012). Effective teaching is what we need to focus on when discussing the use of 1:1 technology.

Included in effective teaching is a discussion on best instructional strategies. Inan, Lowther, Ross, and Strahl (2010) studied the relations between the instructional strategies of the classroom and the use of computer applications. The research was conducted in 39 schools in Tennessee who were receiving federal funding from the US Department of Education to implement technology initiatives. Thirteen of the schools had received Title II Part D (EdTech) funding from the No Child Left Behind Act, and the remaining 26 received funding from the Technology Literacy Challenge Fund. Whole school professional development was a requirement, which allowed for the collection of data from 143 classroom observations. They had two research questions that were addressed: In technology-integrated classrooms what does the classroom environment look like, what delivery tactics are used, and how are the devices used? and What is the correlation between technology activities and best practices for students? The goal of the Inan et al. (2010) was to examine some of the best practices for instructional strategies when attempting to support technology integration. The results were that student-centered activities appear when students have to use software and production apps. It also listed that teachers assuming the roles of facilitators, project based learning, and independent inquiry support best practice initiatives. Teachers become facilitators when students attempt to conquer the content on their own, while teachers guide them in the right direction. Project based learning occurs when students are given a rubric and a topic and are tasked with designing a project that

showcases that learning target has been met. Independent inquiry is when a student investigates something on their own and then shares what was discovered. In all of these choices, students determine how much learning they would like to do. There is not a one size fits all model, especially when students are given a device. However, it is important to have steps in place for students who are unsure how much learning they would like to do.

Support System. Many teachers need support finding the best way to motivate students that don't want to learn, as mentioned above. Vu et al. (2018) wanted to look into how schools were implementing their one-to-one devices. This research was conducted in a mid-western US state through interviews with either educational technology directors or school principals. The interviews show that when districts decided to roll out one-to-one implementation, small committees usually chose routes with minimal cost. The three major questions of the research: How were the initiatives launched? What was the impact on teaching and learning? and What lessons were learned? The most common factors were affordability, device management, durability, and ease of use when deciding what device to implement. According to some of the people who rolled out the technology, they communicated that teachers were left to figure it out on their own. There was no required process or formalized training for teachers to participate in (Vu et al., 2018). This left teachers facing a major road bump when trying to be effective in their personal implementation. Of the participants involved, 10 out of 15 reportedly believed they had witnessed positive changes in the culture of the initiative. One participant reported that an individual student was struggling to learn a concept and now had additional resources to understand and apply the concepts. Another participant reported that they were able to explore outside their classroom, essentially expanding the world for their students. Vu et al. (2018) conclude that stakeholders should seriously consider how they will provide professional

development resources to properly prepare teachers and administrators, so they have creative ways to administer evaluations and ensure that learning actually occurs. It is difficult to provide professional development for strategies that are still evolving. Many schools must rely on personal feedback from teachers in the district in addition to reaching out to educators who are constantly growing technology rich classrooms.

Leadership in the building and district are evidently important. The overall purpose of Shapley et al. (2011) was to investigate the effect of technology immersion on first, student learning opportunities and, second, on student achievement. The research was conducted in Texas middle schools, of which 21 were technology immersion schools and 21 were control schools. Linear modeling was used to analyze survey and achievement data. Shapley et al. (2011) reports third year findings for the participants. Researchers noted that successful technology immersion schools were bias because they had leaders in their administration that were high committed. Technical skills increased, but technology alone did not raise test scores. Research was limited and they wanted to continue development of instruction methods. This continued development of instruction methods should result in 1:1 engagement and motivation strategies.

More concern exists for continued professional development. Curry, Jackson, and Benchic (2018) looked into the effect of the devices on instruction and school change. The reseach was conducted in Kentucky over four years with no significant change in the makeup of the school. When the iPads were implemented, the district provided several days of professional development. The goal was to develop structure for personalized learning and to create excitement surrounding the devices and harness it into student engagement and instructional change. The main questions were: Based on student feedback, did the program succeed in

motivating students to learn? What obstacles were encountered? and Did the program "work?" As related to secondary mathematics, the schools had almost the entire mathematics department using the "flipped classroom" model (Curry et al., 2018). There were positive outcomes to recognize for the district: project-based learning activities, changes to classroom practice, and oversight of device care and maintenance. Items that continue to be a concern: gaming, classroom management, and individual teacher usage. With a district staff adjustment, focus on the one-to-one program was set aside. Curry et al. (2018) noted these suggestions that would be wise for any district to follow: have a timeline for building instructional changes and check progress periodically, organize the program with the expectation that it takes all faculty to succeed, dedicate time and money each year to high-quality professional development surrounding technology driven instruction, and then continue to offer staff and students day to day management and support. Examining the continued support over the course of 4 years allowed for a deeper analysis of the growth for educators. The professional development must continue each year.

Another measure is whether there is a technology facilitator available for continued professional development. Stanhope and Corn (2014) took a look at technology facilitators and their impact on teachers' attitudes, perceptions, and use of technology in the classroom. The state of North Carolina has 18 schools participating in the North Carolina Learning Technology Initiative (NCLTI), four of which were selected for the research. The four schools selected had eliminated their technology facilitators during the spring of 2010, after employing that same position in the spring of 2009. Multiple surveys were given to 75 participating teachers on attitude, self-efficacy, infrastructure, and technology use. Teachers reported that having a technology facilitator allowed them to use technology in lessons, develop confidence with

technology, and maintain laptop efficiency. Once teachers were without a technology facilitator they spent time managing technology instead of using technology to motivate students. Stanhope and Corn (2014) showed that the presence of a technology facilitator boosts teachers commitment level to using technology for student engagement.

Individual Development. Effective teaching includes student-centered activities, but analyzing growth on a case by case basis must also be done. By using interviews, individual rewards and struggles were discovered. The popularity of interviews when analyzing 1:1 classrooms was strong. Harper and Milman (2016) conducted research of literature reviews and examined 1:1 technologies in a K-12 educational setting. The research that was collected had been conducted from 2004 through 2014. They used a total of 46 articles: 29 articles used interviews, 27 articles used surveys, 22 articles used observations, 16 articles used document analysis, 12 articles used test scores and 2 articles used video analysis. The purpose of Harper and Milman (2016) was to see what research was finding about 1:1 technology in the K-12 classroom. The focus was on the following themes: effects on student achievement, changes to the classroom environment, classroom uses, effects on learner motivation and engagement, and challenges to classroom integration. The motivation and engagement portion of this examination tied into the research topic directly. The initial results indicated that given greater use of technology resulted in greater student engagement, however, dedicated analysis shows that the off-task usages stayed the same for each learning environment. Schools with 1:1 laptop programs, compared to schools without such programs, have seen a large reduction in disciplinary actions (Harper and Milman 2016).

With individual interviews in place, a deeper examination into individual growth is possible. Howard and Howard (2017) conducted research about using tablets to motivate urban

high school students, but also completing the research over two years. It took place for two years so that they could observe the classroom and find student motivation and learning trending in a positive direction. They also had teachers provide perspectives of the program's impact with the use of interviews. The freedom for teachers and students to handpick the apps they wanted to use allowed choice for more blend learning and was indicated as a positive. Howard and Howard (2017) conducted research of two semesters and six teachers and observed 16 class periods. All of the observations were conducted by two researchers. After each observed lesson, researchers immediately followed up to clarify any activities. The interviews were conducted with six teachers, who provided information on their perspective, as well as background information, with regards to the use of iPads on their instructions. Observations included: The math support classrooms allowed students to apply content to their individual needs as they were allowed freedom, the increase of collaboration observed when using the iPads, and students were able to have feedback provided to them immediately. An intriguing lesson plan included students competing to create a customized online book that would be selected to use for years to come, which incorporated editing so that special needs students could use it (Howard & Howard, 2017). Studies also talked about engaging in off-task activities with the iPad such as: taking pictures, playing games, and accessing other apps. It noted that when students were reprimanded for inappropriate use, then there were alternative methods for completing the lesson. The deficit to this is it creates double the workload in lesson planning, which may cause teachers to be reluctant to use technology. Some other issues that were noticed included: problems caused when Wi-Fi doesn't work, apps fail or freeze, or students have issues with login information. One observation had a 100% completion rate on iPad assignments, and many others used the iPads as motivation to be quiet and pay attention. Some of the teachers worried about copying and editing

of student work as devices made it easy to share information. The survey resulted in 61% of the students thinking the iPad helped with learning (Howard & Howard, 2017). With this trend in a positive direction, it is important to note the literature stating the device utilized doesn't matter.

Varier et al. (2017) conducted research for teachers and students to weigh in on the implementation of 1:1 devices. The three research questions were: How do teachers integrate devices? How do teachers use the devices to enhance expression, organization, communication, and exploration? and What was the perceived impact of the devices on student engagement and motivation? Varier et al. (2017) was centered around a large and very economically diverse mid-Atlantic school district. The research was done around six different devices in 38 elementary, 12 middle, and 11 high school classrooms. The district served more than 58,000 students in 63 schools. The six devices used were: Dell Laptop, iPad Mini, Windows Tablet, Nexus7, Google Chromebook, and Kindle Fire. All teacher participants attended a one-day training session, were introduced to resources, lesson plans, and device integration tactics. The teachers that participated were selected by school principals who were confident they would be comfortable in the new environment. Once the teacher participants were picked, they selected focus groups from their students. As student groups were selected, focus was placed on representing all grade levels. The students represented noticed a shift to student-centered learning and instruction and their ability to share academic work led to more communication and collaboration (Varier et al., 2017). One limitation was the process of picking students and teachers was done in a way that they include technology competent teachers who had an interest in implementing devices into their classrooms. Students also shared an interest in using a device, which may have brought some additional excitement and engagement. Teachers shared pedagogical shifts from teacher-centered instruction to facilitation of student learning. Focus groups allowed people to discuss

development. Focusing on individuals, it is easy to see the teacher-centered instruction fading through the implementation of 1:1 as movement is made towards student-centered learning.

Student Impact

Transitioning from student feedback into student impact, it becomes important to look at the change in academic achievement, motivation, and beliefs of devices. There is research about how 1:1 has affected academic achievement up to this point. Engagement and motivation occurs in different ways, which allows people opportunity to try different things. Also, student opinions of the devices are going to drive the culture of the 1:1 classrooms, so student belief must be examined.

Motivation. Many researchers have tried to tie 1:1 implementation to motivation and engagement directly. There are literature reviews providing this correlation. Teachers have shifted the way they instruct, offering additional ways to get students involved. Rafool, Sullivan, and Al-Bataineh (2012) studied the implementation of technology and its effects on student engagement, motivation, and satisfaction. Those examined were a group of 4th graders and a group of high school students in central Illinois. All of the participants chose to be included from the months of January through March, in which they joined in on four technology tasks: blog, graphic novel, Prezi, movie maker. Authors used a five-point Likert Scale survey for ten items to measure engagement, motivation, satisfaction, and personal preference with learning. Surveys showed all students preferred using technology as opposed to the traditional model by either agreeing or strongly agreeing. Students reported high levels (72% - 78%) of engagement, motivation, and satisfaction with regards to using technology for learning (Rafool et al., 2012). One weakness was a survey to show change or growth was not completed. Therefore, there was

no data collected for how students felt about the traditional classroom. The students had four options which left room for student choice.

When student choice was taken away, it became tough to keep student motivation. However, a few articles conducted research on something brand new. Cakir (2013) investigated using blogs as a tool in the classroom to improve student engagement with 1:1 devices. The participants were 88 pre-service first year mathematics education program students who took a specific technology integration course in the spring semester of the 2010-2011 school year at a large state university in Turkey. While the research was conducted in Turkey, its findings are beneficial to all pre-service teachers. The goal was to help pre-service teachers understand how blogs affect student engagement. Cakir (2013) states the potential that blogs could have when requiring students to discuss, write, reflect, and comment about classroom content. The finding was that the gender and technical ability of students did not impact student engagement. It also draws conclusions that teachers need to give prompt feedback for blogs to be successful. Two other factors to consider when engaging students with blogs, in addition to feedback, were the ability to monitor and guide the blogs as they develop. Blogs create a culture where feedback and sharing ideas become popular strategies with 1:1 devices.

Taking something popular and utilizing it within the classrooms, is also done with social media. Students need learning to be fun again and social media gives curriculum an extra spark. Andersson et al. (2014) did an interpretative study of students' and teachers' experiences with regards to the use of social media in the classroom. They used a series of interviews and surveys to look closely at the advantages and disadvantages of utilizing social media. The research questions were in 1:1 schools: What issues have come to light with social media use? And why has social media become such a drawback? One weakness is that it took place in

Sweden, in three Swedish schools, with students' aged 10-18. In 2011, 830 students responded to the survey and in 2012, 713 students responded to the survey. The teacher survey saw a growth; it grew from 54 responses to 128 responses from 2011 to 2012 (Andersson et al., 2014). Their findings suggest that education needs to allow fewer freedoms and clarify assignments when working with 1:1 programs. They questioned how much responsibility students can handle at various ages, and would like to further investigate the freedoms that some teachers are leaving students. Andersson et al. (2014) suggested that some of the strategies to reclaim the student are to tighten up the learning sessions and assignments so that students always have clear and available guidance on what to do and the order of the way students are expected to master content. Just having access to technology doesn't mean students will use it wisely. If chains on content are tightened, then examination must be done on whether the learning remains to be student-centered.

The last article examines motivation in poverty. Each student within this demographic must have their own motivation, and look out for their own best interests. Mouza (2008) assessed a laptop program distribution for a primarily poverty and minority school. The school where the data collection took place was located in the New York City school district. The district had 1,277 students of which, were 94% Hispanic and qualified for free lunch. A hidden goal was to provide technology to those who felt they are disadvantaged students. Data collection was done using classroom observations, teacher interviews, student questionnaires, and student focus groups. There remained a control group of students without laptops in addition to the students in technology rich environments within the same school. Academic increases in writing and mathematics were evident in the laptop programs (Mouza, 2008). Students who had experience with laptops, used the laptops to probe and to learn. Students who were without laptops, wanted

the laptops to find employment as well as have access to abundant information. The outcome calls for there to be more research with 1:1 engagement, as more research could only help technology programs reach their full potential. Numerous studies have shown that connecting laptop innovation blueprints with student achievement have given the opportunity for increased effectiveness (Mouza, 2008). At the time, she felt continued learning must be done with her research, although she did see an increase in mathematical and English achievements. This addresses potential growth for students who have issues outside of school that are tough to deal with.

Academic Impact. Crook, Sharma, and Wilson (2014) revealed students of poverty were able to make academic gains in math and English. Research was done in sciences classes, and looked into their academic scores to prove that learning was taking place. Crook et al. (2014) did research on 1:1 student attainment in senior high school science classes. The research was used to decide if 1:1 laptops were a predictor of success in science on Australian exams in which half of the freshmen in 2008 received 1:1 devices while half did not. Crook et al. (2014) took 967 students from 12 high schools in Sydney, Australia. The research questions were geared towards the statewide-examine covering biology, chemistry, and physics. The guiding question was to know if the type of laptop or the environment gave students some advantage with regards to science scores. Student attainment went up in all of the three science subjects: Physics had a 0.38, Biology had a 0.26, and chemistry 0.23 for positive standardized regression coefficients. The data portrays Physics had the greatest increase in student attainment. Crook et al. (2014) examined the questionnaires to point to the use of simulations and spreadsheets with their 1:1 devices as a leading factor for learning. They suggested additional research into how students use their devices and how to best leverage technology in the classroom. Achievement here is

mimicking implementation and best practice language used earlier. There is always going to be the possibility of growth, which is why best practices must continually evolve.

Williams and Larwin (2016) have noted that the initial reaction to devices are positive and students are more engaged. However, as that initial excitement fades away, the question of whether teachers will be able to continue capturing student engagement arises. Williams and Larwin (2016) researched student achievement in Ohio High Schools with the use of one-to-one computing devices. Their immediate goal of the 1:1 devices was to increase student engagement and create excitement, while the ultimate goal was to improve learning. The research conducted had five questions surrounding 1:1 computing: Does implementation affect student achievement? Do test scores vary by content? Do scores vary by demographic group? Does the type of device influence the effect? and Does the longevity of the program influence the effect on student achievement? Williams and Larwin (2016) had 24 high schools in Ohio participate, and data was collected for a range of five to eight years. There were 140 students in both the treatment group and the control group. Very small differences were noted and they concluded that there is not enough of a difference to content area learning when 1:1 technology was implemented. One of the weaknesses is that all students had access to devices at all times but there was no data regarding if students accessed the devices outside of school. Things to implement before starting a 1:1 program: conduct some action research to see what does and doesn't work, continued professional development for teachers after the implementation, and continued monitoring and support of teachers with implementation and lesson planning. This article's conclusion was that 1:1 could have a positive impact on student achievement, but could have also fallen short on that outcome as well (Williams & Larwin, 2016). Therefore the devices itself will not have a positive impact on learning but continued education reforms are going to have the largest impact.

Beliefs. Something that has yet to be discussed is what students' are saying about the 1:1 devices. Feedback from people who have to use the devices every day is important. Ferguson (2016) analyzed middle school students' reactions to using iPads in school using a survey that 676 middle school students completed during class time. A letter of consent was sent home to suburban middle schools in Western New York, and students could opt out if they chose. The survey was completed online, but during the school day, to allow for all students to finish the survey. Teachers were given one week to have students complete the survey to allow flexibility. The leading question in this research was what do students actually think about using the iPad in school? They further dissected that question into demographic data to compare English language learner, gender, and grade level responses. Of the 676 responses, 280 of the students qualified for free lunch, with 55 being reduced lunch. 506 identified as White, 178 identified as Black, 31 identified as Asian, and 26 identified as Hispanic for the whole 747 students (Ferguson, 2016). The research indicate 69% of students feel that they can learn better using an iPad in addition to being more productive. There was some negativity, as 63% said they would rather use paper for some of the assignments, and 60% said they would rather learn from paper in print then the iPad. The seventh graders, who had two years of experience with the iPads, were the most positive. With the most experience, 8th graders, held the most negative views but were also a year behind on implementation. Girls reported that they most missed using paper for some assignments, while boys felt like they could learn better using an iPad. English Language learners were more excited about learning with the iPad, while the English speakers felt there were more distractions with the iPad in class (Ferguson, 2016). Some negativity exists around learning from paper. Districts felt supported by research like this, to reduce classroom sets of books due to budget cuts. Weisberg (2011) studied the transitioning mindset of the classroom with regards to digital

textbooks. The research was conducted at the Sawyer Business School of Suffolk University in Boston, Massachusetts. The research was conducted over two years as students were provided different devices. Students fell under one of six groups: Amazon Kindle, Sony eReader Touch, Apple iPad, enTourage eDGe, CourseSmart, and the last group was given a paper textbook for the semester. According to research, 71% of the students reported that they would use their computer if there was a digital textbook available. Characteristics that led to digital textbooks being preferred: access anywhere and portable, less economic cost, and desired by the "Y" generation. Characteristics that led to paper textbooks being preferred: limits distractions and personal comfortability (Weisberg, 2011). Test scores from assigned readings school wide provided no significant difference between devices. The conclusion was the learning of course material maintained regardless of the choice between digital and traditional textbooks. Since this research exists, districts felt justified pulling books from the shelf and paying for textbooks digitally.

Pedagogy

Methods that classrooms utilize during the school day vary with the use of technology. Some educators have tried to create a flipped classroom. However, there has been a greater shift to more blended learning experiences. No matter what the instruction method may be, school should be a time for students to experience a possible work environment they may see when they graduate.

Flipped Classroom. Teacher centered instruction allows students to learn at a pace that the teacher deems appropriate. A flipped classroom allows for students to learn at a pace comfortable for them, as they are delivered the content at home, due to the classroom being used for working through practices at individual students pace. Teachers are able to be available

during class time for questions which increases the opportunity for personalized learning. The purpose of Delialioğlu's (2012) research was to discover the impact different instructional approaches, with technology, would have on student engagement. Middle East Technical University in Ankara, Turkey took its computer networks course and designed it into a specific study. The computer network course was split in two parts; the first half of the class was lecture-based blended learning and the last half of the class was problem-based blended learning. It used 89 pre-service teaching students. The results show that time on task and active learning were significantly higher in the problem-based part of the course. Delialioğlu's (2012) established the idea that an increase in learning is not due to individual differences in students, but specifically the learning environment that is provided to the student, which is a key idea. This blended learning environment offers three advantages: students were able to tackle material at their own pace, had the opportunity to discuss material with their peers, and were provided the ability to meet with instructors. When you consider the different ideas around pedagogy and direct instruction, this article could create curiosity for school districts and other researchers.

Kostaris et al. (2017) investigated the potential of flipped classrooms. The research resulted in evidence for advantages in students' learning outcomes by levels of competencies met. They were met by using class time for face-to-face sessions, level of motivation by the student, as well as the students' overall classroom engagement. They used two classes, one as a traditional group and one as the control, to inspect over a period of a full semester. The classes were 8th grade students who were participating in a class with curriculum around computing. The online classroom or learning management system for the one class was Moodle. The low performing students had the most improvement on assessment scores. As far as increase in engagement goes: low performers experienced a 30.1% increase, medium performers a 16.3%

increase, and high performers a 7.8% increase (Kostaris et al., 2017). Added-value to these findings, were low performers were identified as the group that experienced the largest improvement, which can be contributed to the formative feedback and scaffolding that can be accomplish during face to face interaction. Another idea is that the classmates engage in collaborative activities when given the time in a flipped classroom model. Since the experimental group showed statistically significant increase in their motivation, we can contribute this to the learning process and connecting their own interests and sense of accomplishment. The experimental group showed increase in motivation, which is interesting for complete flipped classroom model research.

The main purpose of Unruh et al. (2016) was to examine the flipped classroom model with regards to teachers' ability with technology to efficiently do their job. The researchers examined 12 secondary education classrooms in south-eastern Texas. Six flipped classrooms were matched with six traditional classrooms in demographics and years of teaching experiences. In a flipped classroom model, the teacher was able to connect personally with 15 out of 18 students, which allowed time for personalized instruction. Things that can be attributed to the flipped classroom model used: 59% more comfort level with technology, 80% more use of technology in the classroom, 55% more positive attitudes with technology, and 47% better teaching efficacy. School districts must continue to develop the repertoire of teachers through innovative practices and support them through failure (Unruh et al., 2016). Teachers in the flipped model could measure student engagement by the number of questions they asked and the level of thinking that went into the question. Flipped classroom teachers didn't think technology itself engaged the students, however, the engagement level was higher because they were able to meet the needs of each individual student.

Shift. Pedagogy is an important concept in education. When considering teacher education, many universities have not begun teaching educators to use technology in the classroom. Baran (2014) focused on the effectiveness of teacher education programs with regard to mobile learning. The results of mobile learning led to changes in pedagogy practices in teacher education, and the researchers looked to match those changes to mobile learning. The pedagogy shift for mobile learning is consistent with those found in 1:1 devices. Instead of looking at the value of mobile learning in the classroom, Baran (2014) looked at how it could, and should, be combined with teacher education. The strength is that it points out the number of studies that have been published within recent years in regards to changing pedagogy taught to up and coming teachers. It had six main findings that have emerged as points of interest in the collection of studies: (a) mobile learning has become more popular in educational contexts; (b) there was a lack of theory and concepts being reported; (c) the usage, attitudes, and perceptions of mobile learning varies; (d) the involvement of mobile learning and devices has been valuable; (e) teachers aren't reported roadblocks; and (f) pre-service teacher education has started to incorporate mobile learning. In conclusion, it suggested that the studies discussing mobile learning have a wide range of attitudes and perceptions. The studies are all saying that mobile learning is beneficial, however, very few of these studies are reporting the challenges of mobile learning (Baran, 2014). Therefore, researchers need to keep looking for patterns that can be developed into best practices. They are looking for patterns to change attitudes and perceptions in the classroom. This will remove the walls of the classroom and allow for learning to happen anywhere, which is why 1:1 devices connects to this research.

Another door opened by technology is that feedback is able to happen anywhere and at all times for students. The main purpose for Parkin, Hepplestone, Holden, Irwin and Thorpe

(2012) was to evaluate how a range of technical interventions might encourage students to engage with feedback and create an opportunity to improve learning. A device gives them opportunity for give and take in feedback, instead of a score in red pen at the top of the page. The guiding question of the research was whether online publication of grades and feedback, adaptive release of grades, or linking feedback to assessment criteria added the most value to overall feedback. Parkin et al. (2012) used 23 second-year undergraduates, in which fourteen were women and nine were men, at Sheffield Hallam University in the United Kingdom. It did acknowledge that this is a very small sample size. The data was analyzed with a thematic approach, and the main themes were used to design some best practice guides. It went on to examine different technology feedback and actions that students agreed were best practice. A discovery about online feedback was that students could view it at home in privacy when they were emotionally ready (Parkin, 2012). The use of 1:1 devices will allow students the same opportunity, to engage with feedback privately. When looking at mental health as well as maturity, importance must be placed on what is best for students. There must be a shift from posting grades to writing sentences in providing feedback with deeper knowledge.

As feedback changes and the walls of a classroom disappear, so can the expectations of the classroom. Once learning has become student-centered, it must not revert to teacher instruction. This article ties to implementation, but has some powerful words about pedagogy. Downes and Bishop (2015) examined the characteristics of schools that effectively implemented their 1:1 laptop programs after a four year period. Through individual interviews, focus groups, and reviews of student work, they collected data to report. The research was guided by the following questions: How does the implementation of a 1:1 program fit with the characteristics of effective middle level schools? What are the opportunities and tensions when confronted with

the challenges of 1:1? The site for this research was one team in a middle school serving a town of roughly 10,000 residents in the state of Vermont. Researchers selected team teachers committed to using technology within an integrative curriculum, and so each of these team teachers received laptops for 1:1 computing. Teachers and students did focus groups and interviews for receiving their device. Also, a coach conducted field notes twice a week and then twice monthly near the end of the research. Downes and Bishop (2015) conducted this in a rural location with a mostly white population. Additional bias may have been present as the researchers spent 4 years at the middle school level, so their relationships may have had influence. However, this research led to many lessons worth considering as educators continue their work with the 1:1 use of technologies. Teachers and students both agree that engagement, relevance to student's lives, and inspiration for teachers is why 1:1 access is such a growing force in education. Also, it was noted that once the students came to expect a 1:1 environment that was student-centered, it was impossible for students to trust their teachers again. Teachers discussed needing the common planning time to serve students better with technology-rich pedagogy. Common planning time is another way of saying teachers need a support system to continue learning best practices.

Implementation, beliefs, and the shift of pedagogy are further discussed in the following article. The purpose of Geer, White, Zeegers, Au, and Barnes (2015) was to examine the impact of iPads on pedagogy. This research was done by conducting a multi-setting case approach that reported evidence from four metropolitan schools. The methods used were focus groups, online surveys, and structured interviews. In this research, 86% of students found the iPad useful for learning. Also, the data provides evidence that there was a positive change in collaboration, communication, self-reliance/autonomy and authenticity through the use of ipads. One thing is

for certain, iPads in the classroom provide students with a richer opportunity to do research, communicate, and create products of learning. This research also suggests that a structured professional learning program would be great for improving pedagogy, which will allow for increased motivation and student engagement. It observed different strategies used when introducing new technology: some schools provided extensive professional development or provided teachers with the tool and the time to explore before implementing into the classroom. The biggest implication is that the learning has become student-centered (Geer et al., 2015). Students are empowered with their device; it's their own camera and their own evidence of work.

CHAPTER III: SUMMARY AND DISCUSSION

Summary of Research

Many studies investigated 1:1 initiatives and the proper use in the classroom to enhance engagement and motivation. Mindset, Implementation, Student Impact, and Pedagogy highlight ways to discuss how 1:1 education is evolving into more student centered learning. Mindset is evident that initial responses for teachers is to resist change. Implementation is evidence of what does and doesn't work as districts roll out their own technology missions.

Mindset change can be broken into two ideas: preconceptions that exist and philosophies that are ever changing. Some preconceptions that exist are whether devices would assist in higher level of thinking, but before that we had software. There is evidence that show a consistent relationship between instructional use of computers and the software that was chosen (Niederhauser & Stoddart, 2001). This research was conducted well before 1:1 devices appeared in the classroom. Once devices showed up students who struggle with technology, tried to use technology to learn math more efficiently (Barkatsas et al,. 2009). This was shown as an attempt for them to learn two things at once. Hermans et al. (2008) discovered as their most important result, that preconceptions of teachers' educational beliefs reduced their motivation in using technology in the classroom. These articles provide research into the initial ideas around technology in education, and many still hold true in our current educational system.

The philosophies of teaching strategies also impacts teachers' mindset about 1:1 implementation. Many teachers have confidence in what they are teaching, except when they don't believe in it. Paraskeva et al. (2008) noted that having trainings in technology as a "tool" could change their attitudes towards technology. Even more experience with technology could allow for growth in confidence and usefulness (Ferguson, 2016; Paraskeva et al., 2008) Teachers

needed experience using technology not for lesson planning, email, and reports but also classroom activities and access to information that exists outside of the classroom. Mouza (2011) that even teachers who could connect technology, content, and pedagogy were still hesitant to use technology in multifaceted student-centered ways. This is why the mindset shift has begun but needs to continue.

Implementation ideas are ever changing, and things to consider are effective teaching, support systems, and individual development. Gebre et al. (2012) showed how there are different levels of engagement in technology rich classrooms. The important piece was the need for professional development to change the ideas around what effective teaching looks like (Gebre et al., 2012; Paraskeva, 2008; Unruh et al., 2016). Inan et al. (2010) showed that effective teaching evolved into a student-centered classroom practice when technology was integrated into lessons.

Districts and school boards around the country who want to make sure 1:1 is a wise decision benefit from research done at other schools. Vu et al. (2018) presented that usually a committee made the decisions on which devices to acquire for the district, and cost was usually the deciding factor. Shapley et al. (2011) noted that schools that found success had administration that secured a positive culture around the devices. It is not just the presence of devices alone that is going to create successful implementation (Unruh et al., 2016). Teachers rely on experienced district staff members to handle network infrastructure and trouble shooting. Stanhope and Corn (2014) lobbied in their conclusion that the presence of a full time technology facilitator was mandatory for success. Along with a technology facilitator, there is a constant need for training, support, and high-quality professional development (Curry et al., 2018; Unruh et al., 2016; Williams & Larwin, 2016). Howard and Howard (2017) determined that the flexibility to select apps that correlates best with their content maximized potential for their

learners. Student choice creates motivation for students, so mimicking it for teachers follows suit for a strong support plan for individual development.

Many students have to learn as individuals before they can assist others. When we look into students opinions, they have shared some valuable information. Varier et al. (2017) found that a 1:1 environment allows students to become more self-directed and independent. The reason for this has to be ownership of their grade. Harper and Millman (2016) found that off-task behaviors do exist when technology is mishandled. Not only are students responsible for their individual development, but it helps us find ways for best implementation.

New research is usually geared to see if there are any positive student impacts through the new design. Student impact could look differently but the use of motivation, achievement, and beliefs surrounding technology. Early student-centered conversation started with computers, as they initial strength motivation towards schoolwork, academic outcomes, and independence (Ruthven et al., 2004). As the wow effect of devices wore off, teachers started getting creative with classroom lesson plans. There was research that tried to use blogs and social media to engage and motivate students (Andersson et al., 2014; Cakir 2013). The idea of sharing ideas without complex systems allowed students who were interested in certain things to collaborate.

Some studies focused solely on the impact of achievement with test scores. Mouza (2008) did research of predominantly low-income students to discover the change of students' attitudes and outcomes with the use of technology. With 1:1 rollouts happening across the country it should limit the technology divide between districts. The main thing for the minority students was the potential of devices to provide authentic learning experience that imitate those work experience of the 21st century (Mouza, 2008; Rafool et al., 2012). Not only were identified students excited about the opportunity for authentic learning, but some students got excited about

the increased learning in science. Crook et al. (2014) reported significant positive shifts in their achievement test. They used physics, chemistry and science to examine how technology was used. The way that they used technology for fascinating. Not only were they using word processing, presentations, and email, but they had more to add. They communicated that spreadsheets and simulations were the tools that reported the best attainment (Crook et al., 2014). Which is consistent in the finding of Williams and Larwin (2016) as access and use of the 1:1 devices were the only implementation factor that yielded a strong relationship to achievement. This tells us that students need to consistently use the devices on applications that provide a useful way to maneuver through content areas.

Now as students tend to show signs of achievement improvements, it is also important to monitor what kind of impact the devices are having on student beliefs. Weisberg (2011) showed how students' reluctant opinion quickly shift to acceptance of online books. Students also shared that paperless curriculum was not an option, especially in classes like math (Ferguson, 2016). Another positive was in the area of feedback. Parkin et al. (2012) noticed that students were in favor of feedback being typed now as well as being able to receive feedback at home when they were away from peers. Some of their beliefs need to be taken into account so that new teaching practices could be developed.

These practices that are new to the classroom show that there will be a shift in culture and pedagogy as we try new things, such as flipped classrooms. Kostaris et al. (2017) reported that low performing students had the greatest academic improvement from a flipped classroom model. This is why flipped classroom teacher believe they can meet the needs of individual students more effectively (Unruh et al., 2016). Traditional learning environments don't allow the time that teachers need to engage and be involved with students through problem-based learning

(Delialioğlu, 2013; Unruh et al., 2016). The most telling indicator of successful integration is when the teacher transitions from instructional leader to that as a facilitator (Curry et al., 2018).

Originally teachers were masters of content and were sharing it with students. Now we have shifted to student-centered learning. Baran (2014) investigated mobile learning, but what was presented was that teachers were learning about mobile learning, instead of learning with the student. Teachers can't use 1:1 technology to motivate and engage students if they themselves are just learning how to use it. Students are capable of advocating for themselves and discovering the way in which they learn best. Even at this stage in exploration of devices, there is still suggestion that professional development will be key to maximizing learning (Downes & Bishop, 2015; Geer et al., 2015). Paraskeva et al. (2008) wanted technology to allow students opportunity to do project-based activities to develop problem solving techniques. We need to be careful about student-centered pedagogy because once students come to expect such an environment, retreating from it could result in lost engagement (Downes & Bishop, 2015). This implies that once students adjust to student-centered learning, students develop an understanding that student-centered learning is what is best for them. As we learn to master our planning, design, and implementation of 1:1 environments, we need to continue to research student-centered learning.

All of this research leads the conclusion that student-centered learning is the next step for education systems. As student-centered learning relies on our educational goals and pedagogical innovation to optimize technology (Rafool et al., 2012; Varier et al., 2017; Williams & Larwin 2016). 1:1 environments provide for students who are engaged, self-directed, collaborative, and independent to find ways to be successful in life, further education, and careers (Shapley et al., 2011; Varier et al., 2017).

Limitations of Research

The research completed for this study was found through the searches EBSCOhost and Academic Search Premier with the publication dates of 2001-2018. These searches were narrowed using the following keywords: “engagement in 1:1 schools”, “motivation in 1:1 schools”, and “1:1 engagement in education.” Obviously like most things in education, there are still gaps in the research that should be filled in.

The processes of 1:1 are different everywhere and there are many determining factors. This means that current research is extremely diverse and needs more studies to find what the best practice would actually look like. Research shows a couple pedagogy ideas to use in the classroom, and teachers are using them but looking to continue to grow as well. There is a limit also on the number of studies at just the high school level. Some of the studies had small sample sizes of one class of 20 while some of the studies had statewide data of 41 high schools.

Implications for Future Research

Future research could be narrowed into the last couple years as more and more studies are beginning to share successful 1:1 data. With continued data, we can change teachers’ mindset and show positive impact for students. Teachers also need to be supported in the classroom. We should strive to find research that discusses the best way to support the teacher in the classroom, but also more high level professional development. There are tons of changes coming to education as we find more tactics to keep learning student-centered.

Also flipped classroom was a mention of a popular way to make learning student-centered, however there are many blended classrooms that could be perfect for different teachers. This way teachers could decide how to take their preconceptions and change them into what they think is best for students. Future studies should move away from investigating the impacts of 1:1

on student achievement and start considering putting their focus on development, implementation and design of their programs (Harper & Millman, 2016). Varier et al. (2017) supports that more research into how 1:1 pedagogy could shift into preparing kids with soft skills to be more successful in life after high school.

Implications for Professional Application

The aim of this project was to learn how to become a more effective teacher in my district, so as to aid in personal professional development. As someone who uses device for alternate delivery of instruction, this research was implemented. Learning to serve my school and the students was the primary goal of the research. There are many applications that to consider from this research.

Teachers who work in a 1:1 environment are trying to create students who are "more self-directed, independent, and collaborative in the learning process" (Varier et al., p. 984). But in the busy nature of fitting all the content into the school year, it is easy to not make time for implementation of technology. We have to strive to make lesson plans that promote technology to increase motivation and engagement.

Many school districts adapt 1:1 initiatives. Administration wants to see a continued use in the classroom, and pedagogy is ever changing. Each content area has different ways to take advantage of apps available to design 21st century activities. However, we need to demand training and professional development that incorporates the 21st century skills that students are going to need. Staff need to share ideas across content so that teachers don't make the same mistake twice in the same building. This creates a need for collaboration time among staff to share pedagogy ideas and build on each individual success.

Success is not going to be built overnight, so when staff is sharing ideas about successful classroom practices people need to listen. As we approach professional development days, we need to ask questions about support in our classrooms for trial and error. For 1:1 technology to be successful we need to have all stakeholders involved in the process. From school board members, to administration, to teachers and all the way back to students, it is our job to make sure the culture is one of those were mistakes are acceptable but that perseverance and persistence will create favorable results.

Conclusion

The aim of this thesis was to determine if 1:1 devices are useful to increase motivation and engagement in the classroom. It is not the device itself that increases motivation or engagement. It is rather the development of student-centered learning that comes with the device. By using non-lecture methods for delivery of content, students are able to advocate for themselves through collaboration. Students are able to collaborate through devices, through peer-to-peer, or even through face-to-face conversations with the teacher. It appears that all successful implementations of devices have a few things in common: they have a strong support through administration, they have continued district plans to research how often students are using their devices, and there is a plan for continued professional development. There are many benefits to having 1:1 devices in the classroom. The biggest impact is students having a blended learning environment to work individual with students. With this in mind teachers and administrators should be finding ways to incorporate 1:1 devices with student-centered learning to increase the level of learning that can take place for students.

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