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# Assessing At-Risk Students' Attitudes Toward The Implementation of Instructional Technology

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# Assessing At-Risk Students' Attitudes Toward The Implementation of Instructional Technology

by

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## ABSTRACT

With the growing trend on the reliance on technology in today's youth, education has also been changing with the implementation of technology in the classroom setting. With immigrant populations increasing in the US, K-12 education must meet the demand in education to not only first generation immigrant students, but also to their reliance on technology. Research has been conducted on at-risk students and the implementation of technology in the classroom, but not so much on what first generation immigrant at-risk students think of the implementation of one computer for every student in the classroom setting and if they find it beneficial to their education. For this study, quantitative data were collected at an alternative school in northeast Texas. All 74 participants were night school students who had previously dropped out of high school and were returning to earn their high school diploma. Statistical analysis indicated that there were statistically significant relationships between the students' reported level of laptop integration in the classroom and their level of reported learning, the students' reported level of laptop proficiency and their reported level of learning, and the relationship between the students' attitude towards learning and their level of reported laptop usage. Based on these results, it was determined that this group of at-risk students in the sample value the implementation of laptops in their classroom setting and see them as an asset to their education.

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# DEDICATION

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LIST OF ABBREVIATIONS

| | |
|---|---|
| *AECT* | Association for Educational Communications and Technology |
| *IT* | Instructional Technology |
| *K-12* | Kindergarten through 12th grade |
| *Mac* | Macintosh (Apple) Computer |
| *PC* | Personal Computer |
| STEM | Science, Technology, Engineering, and |

# CHAPTER I - INTRODUCTION

Classrooms are changing. What used to be the norm of chalk and blackboard is quickly becoming digitalized due to breakthroughs in technology. With that modernization, instructional technology (IT) is becoming increasingly prevalent (Puckett, 2013). Many, including politicians and educators, believe that IT will make a drastic change to the educational world (Laurillard, 2007; Chen, 2011). This can be seen in its widespread implementation. Instructional technology is attractive to students because it keeps students engaged in the learning process while appealing to different learning styles (Puckett, 2013). Some researchers have concluded that IT has the potential to significantly improve academic test scores (Shaw, Giles, & Hibberts, 2013), while other researchers have stated that it has strengthened problem-solving skills (Bai, Pan, Hirumi, & Kebritchi, 2012). However, to implement IT and its benefits, educators must be willing to apply it in their classrooms.

Badia, Meneses, and Sigales (2013) state that there are six characteristics of a teacher's willingness to apply IT in the classroom. These are the teachers' attitudes regarding its usefulness, their ability to innovate, their expertise in using the equipment, their attitudes, their beliefs about teaching and learning, and their opinions concerning the IT. Other researchers (Perrotta, 2013) have stated that some teachers may feel as though they are "accommodating" technology in their classroom, and may view it as a threat, that may take away from the level of authority they hold over their students. Wadmany and Kliachko (2014) state that more traditionalist teachers, who have a conservative view towards education, view IT in a negative light. Research conducted by Bataineh and Anderson (2015) reveals that the youngest teachers had higher scores for positive

technological self-perceptions, while more experienced teachers scored lower in comparison to their younger counterparts. Younger teachers were also more open to newer ideas regarding digital enhancements and technical equipment. With varied opinions about IT raises a question regarding its automatic implementation in the K-12 classroom.

The students in K-12 today were born in a digital age. They are "digital natives" who have grown up around technology their entire lives. They can access information quickly, and gain information via technology more readily than those with less experience (Reinhart, Thomas, & Toriskie, 2011). As a result, it is logical that the K-12 classrooms should incorporate IT within their curriculum. The incorporation of IT, along with added peripherals in the classroom, has been shown to increase student engagement and achievement (Cavanaugh, Dawson, & Ritzhaupt, 2011). Moreover, within the workforce, a lack of digital literacy may prevent future graduates from getting a job if they are not exposed to these types of technology frequently in their K-12 school years. Technology can be helpful for many reasons, but only if it is taught in the right way, and not just to improve state standardized test scores (Vanslyke-Briggs, Hogan, Waffle, & Samplaski, 2015). While the benefits of IT can be seen in the K-12 classroom, the question lingers about the applicability to students in the special education setting.

Instructional technology may not only benefit regular education students, but it may benefit special needs students who are placed in regular classes as well. Researchers Balmeo, Nimo, Pagal, Puga, ArisDafQuiño, & Sanwen (2014) conclude that IT simplifies complex ideas for these special needs students, and many times offers them an assistive tool. With IT, many of these special needs students can achieve at the same level as their

non-special needs peers. Alnahdi (2014) states that IT, if used accurately, can enrich the lives of special needs students in school; it can also give special needs students the potential to face academics with fewer problems and challenges. Marino and Beecher (2010) report that IT has the potential to increase motivation and self-esteem in special needs students. Indeed, it is a common observation that the addition of IT can positively increase learning outcomes of special needs students (Vasquez & Straub, 2012; Cheung & Slavin, 2013; Peterson-Karlan, 2011). With the demonstrated benefits of IT, it would seem that it would be advantageous to provide it in the classroom.

A teacher's willingness to use the technology seems to be the driving force behind whether or not the technology gets implemented (Hancock, Knezek, & Christensen, 2007). There are, however, barriers when it comes to applying IT in the classroom. According to Winslow, Smith, & Dickerson (2014), these obstacles can be thought of as external to the classroom (such as access to technology, time, training, and support), or internal to the classroom (a teacher's beliefs about the use of technology, teacher-student roles, and assessment practices). Because of these external and internal barriers, some teachers have claimed that much of their IT has gone unused, though many are willing to put in the time and effort to utilize it in their classrooms. Some teachers prefer to use IT in the educational setting since they see it as a positive enhancer. Hechter and Vermette (2013) report that teachers who view IT positively are more likely to succeed in integrating it into their classrooms, despite any barriers they may face, internally or externally. Hecther and Vermette (2013) also believe that the changing and dynamic structure of modern classrooms, along with the changing nature of technology, keeps many teachers from successfully implementing IT.

At the same time, K-12 education in the United States has been viewed by many as deteriorating as a result of factors like cost, quality of education, effectiveness, spending, and direction (Hechter & Vermette, 2013). With the focus on standardized testing and lack of funding, it appears that teachers may not be educating students in a way that is optimal for learning (Starr, 2012). The learning styles and needs of the 21st-century student are changing (Deubel, 2006). Traditional teaching methods may be becoming outdated, and new teaching methods should be adopted to meet these different learning styles. This can be done with IT integration. Teens and young adults are spending increased amounts of time in front of televisions playing video games (Chaudhary, 2008). Some may argue for combining these types of digital games with education (National Summit on Educational Games, 2006). If teens like to play digital games, then why not have them learn at the same time?

Digital game-based learning takes education and puts it into a video game format that is engaging for the student (Prensky, 2001). Like others, Prensky (2001) states that because the younger generation grew up with cell phones, computers, Google, the Internet, and other types of multimedia, they learn differently than the generations that came before them. Because they learn differently, they must be taught differently.

It is apparent that IT is here to stay (Baldwin, Metaxas, & Wood, 2000). Whereas there are numerous benefits for many students, according to Ferdig (2006), the main reason to assess IT is to ensure that a thorough analysis is conducted to confirm the students' cognition and effect has changed due to learning through enhancement with IT. Other researchers state similar conclusions, noting that the technology must meet student needs and build interpersonal relationships (McCombs, 2000) and specifying where the

teacher can take appropriate actions to ensure remediation and interventions from the application (Jones & Paolucci, 2000).

Piaget's Constructivist Theory states that students learn by interacting with the environment around them, constructing their knowledge from these interactions (Razak & Connolly, 2013; Duhany & Duhaney, 2000; Yaman, 2010; Overby & Jones, 2015). The Constructivist Theory is an appropriate model for IT, in that with IT students are actively engaged in the learning process, and are encouraged to solve problems, discuss ideas, and acquire new knowledge from being introduced to new information in a way that appeals to them (Tucker, 2014).

From a teacher's point of view, the Constructivist Theory can be meaningful in that those teachers who more highly adhere to a constructivist view of teaching tend to be more willing to adopt IT in their classroom. Understanding that students learn by doing, these teachers may want their students to "experience" education rather than just listen and take notes in a classroom (Sang, Valcke, van Braak, & Zhu, 2010).

In the K-12 educational setting, the Constructivist Theory can be applied to the implementation of IT in that students can actively use IT to explore, enhance in-depth problem-solving skills, authenticate instructional tasks, learn cooperatively, and facilitate discussions with the teacher (Hauser & Malouf, 1996). With the use of IT, students can learn through the process of trying to make things happen by manipulating environments, rather than by merely absorbing lessons dictated by the teacher (Lunenburg, 1998). Other benefits of the inclusion of IT include sensory input, information perception, individualized learning plans, enhanced learning environments, application, and collaborative learning (Fu, 2010).

In the e-learning environment, the constructivist approach is relevant in that students are held accountable for their own education. According to Parkes, Reading, & Stein (2013), they have a greater responsibility for their classes and attendance, and this approach attracts many. There are many benefits to getting an education via the e-learning method, and research has shown that it can significantly improve academic achievement scores.

Learning via video games also utilizes the constructivist approach in that when students play a game, they are immersed in a world in which they are interacting socially and constructing knowledge of the subject matter. They are learning social processes of what is acceptable as a rule and what is not acceptable. This allows them to develop decision-making skills as they construct new strategies (Wu, Hsiao, Wu, Lin, & Huang, 2011). The constructivist approach of learning through video games is appropriate because players learn rules by hypothesis testing, mental reflection, and construction. Players create their own unique way of understanding the game (Ang, Avni, & Zaphiris, 2008).

## Problem statement

When research is conducted on the effectiveness of instructional technology in the classroom setting, it is usually from the standpoint of the teacher. If the viewpoints of the students are taken, they are almost always regular education students. The gap in the literature is that there is virtually no research from the view of at-risk students and the effectiveness of instructional technology in their educational setting. School districts are pushing for the use of more instructional technology, and the teachers are forcing it on the students. If the instructional technology is to help at-risk students succeed at

graduating and in their lives after high school, studies are needed on how they view the importance of it in their education.

## Purpose statement

The primary goal of this study is to determine at-risk students' attitudes towards the effectiveness of IT in their classrooms.

## Research questions

1. Is there a statistically significant relationship between the students' reported level of laptop integration in the classroom and their level of reported learning?
2. Is there a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning?
3. Is there a statistically significant relationship between the students' reported attitudes towards learning and their level of reported laptop usage?

## Hypotheses

1. There is a statistically significant relationship between the students' reported level of laptop integration and their reported level of learning.
2. There is a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning.
3. There is a statistically significant relationship between the students' reported attitudes towards learning and their level of reported laptop usage.

## Justification

Studies conducted on instructional technology in the K-12 classroom are almost always from the viewpoint of the teacher. This is true for several reasons, one being that the students are minors, and collecting the paperwork necessary to obtain the opinions of

several classrooms of minors would be a tremendous hassle. The school used in this study is unique in that most of the students are adults, of at least 18 years of age. Most of these students have jobs that they work at during the day and/or a family that they care for. This school meets regularly at night, with classes scheduled from 4:00 pm to 10:00 pm. The students who attend the high school in this study are not "regular" high school students, and their opinions are not the opinions of "regular" students. These students have dropped out of school once before, and are getting a second chance to earn their high school diplomas. These are at-risk students, whom the educational system did not help before, but who have now chosen to attend school during the evening hours. For some of the students, their attendance is spotty; they have high truancy caused by the lack of childcare or work schedules. These students are truly ones "at-risk," and their opinions genuinely represent at-risk students, especially when it comes to the importance of instructional technology in the educational setting. If a particular instructional method is implemented in this school system (such as all students getting laptops), it would be valuable to know.

## Definitions of terms

*At-risk students* are students who have average intelligence, but whose academic background and/or prior performances may cause them to be candidates for future withdrawal or academic failure from the school system (Yeh, 2002).

*Instructional technology* is a process that involves planning, implementing, evaluating, and managing the use of technology to enhance teaching and learning in the classroom setting through the use of technology tools (Garza Mitchell, 2011).

*E-learning* is the notion of learning from a distance and is synonymous with online learning, distance learning, computer-assisted instruction, computer-based instruction, technology-based instruction, technology-delivered instruction, computer-based simulation, and simulation games (Bell & Federman, 2013).

## Delimitations

The delimitations to this study are that it only includes students who are enrolled at an alternative school in a large school district in Texas. This school specifically serves a population of students who have either already dropped out or are in danger of dropping out for multiple reasons, such as teen pregnancy, full-time jobs, recent immigration, or lack of success in the regular high school. (Success High School, 2017). This school provides students with the opportunity to complete high school in a way that is a better fit for their personal and educational needs, enabling them to graduate before they turn 22 and can no longer attend high school. (Success High School, 2017) Due to these population restrictions, the results of this study may not be generalized to schools throughout the entire United States. The questionnaire used in this study is entirely quantitative.

## Assumptions

It is assumed that all respondents in this study answered freely and honestly to the best of their ability. It is also believed that there were no attempts to coerce their answers or to require participation in this study. Other assumptions include that all participants are students at Success High School within the Fort Worth Independent School District.

## Summary

Today's youth are dissimilar than the generations that came before them. They have grown up with the mentality of a digitally connected world, having grown up with more abundant technology than their predecessors. Thus they learn differently and must be taught differently. Jean Piaget states in his Constructivist Theory that students learn best when they learn from their environment and can manipulate and learn from those manipulations. Through the use of IT, students can learn course material that they were previously thought to be incapable of learning in the classroom. Through these instructional technologies, students can also manipulate the stimuli digitally to enhance their learning experience.

However, this study could determine if these IT components are used to enhance the lessons, or if they are being used to just "pass the time." Also, this study will determine if at-risk students believe that IT is a vital part of their academic success. The student-perceived outcomes from this study could potentially be used to determine if the use of IT is effective at helping all students increase their academic achievement.

# CHAPTER II – REVIEW OF THE LITERATURE

## Instructional technology

In the modern classroom, digital technology that assists in augmenting the learning process is becoming increasingly prevalent (Puckett, 2013). Educators, whether they are teachers, administrators, professors, politicians, or reporters, continually use technology. Technology refers to a scientific process or component that is utilized to enhance the instructional process. However, this definition has seemingly been lost between theory and practice (Mellon, 1999). The evolution of the description of "educational technology" has an extensive history. Ibrahim (2015) notes several key dates regarding this changing definition. Before 1963, educational technology was viewed only as instructional media, a way to present instruction to learners. In 1963, this term was synonymous with "Audio, Visual Communication." In 1970, the definition included design, production, utilization, and evaluation of technology. Then, in 1972, the meaning shifted to a systematic process of developing and using instructional resources. In 1977, the definition became more complex, and by 1994, the term changed from "educational" technology to "instructional" technology. In a 2008 study (Ibrahim, 2015), the term reverted to "educational" technology. The Association for Educational Communications and Technology's (AECT) 2008 definition of educational technology is:

> … the ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (AECT, 2008).

Instructional technology is expected to drastically change both the effectiveness and quality of the learning process in the upcoming years (AECT, 2008). According to Laurillard, (2007) researchers predict that one of the key contributions will be a more "personalized learning" environment for future students (Laurillard, 2007). For instructors to use technology effectively, one suggested approach is the implementation of a wide-scale, long-term initiative that includes appropriate access to technology for students and staff, as well as adequate technology integration training in the classroom (Christensen & Knezek, 2001). Researchers Christensen and Knezek (2001) also have concluded that other essential ingredients for the successful integration of technology in the classroom include the will, skill, and tools, all of which can increase the level of student engagement throughout the learning process.

Researchers such as Hsieh, Lin, & Hou, (2014) and Hur and Oh (2012) have shown that the implementation of IT enhances student engagement in the educational setting. Many students are excited to use these tools because it keeps them motivated, and in turn, it helps them learn successfully in the classroom. When correctly implemented, these ITs can also be used to reach different learning styles while keeping the students' interests (Puckett, 2013). Keller, Finkelstein, Perkins, and Pollock (2007) propose that the integration of IT in the classroom correlates with more insightful cognitive thought processes on the part of students. These same researchers have stated that the integration of IT allows students to have more productive discussions while in class than those students in the control group. Incorporating students' interests through the use of different types of technology, such as educational video games, may further spark student interest in and engagement towards learning new concepts in the classroom.

Deubel (2006) states that the learning styles and needs of students in the 21st century are changing. Traditional teaching methods are becoming outdated, and teachers need to adapt their techniques to meet the learning styles of today's modern adolescents. One way that teachers may meet these needs is to integrate technology into their classrooms. The question then becomes how to make students actively engaged in learning while at the same time using technology to engage student performance.

Researchers Shaw, Giles and Hibberts (2013) state that the integration of IT to enhance lessons has significant potential to improve academic scores. Educational video games, for example, can be beneficial to students in that they get to experience learning by simulated visualization, authentic problem-solving, and instant feedback (Bai, Pan, Hirumi, & Kebritchi, 2012). Educational games can provide other benefits that enhance learning in the classroom. The games can provide competition between individuals that can, in turn, motivate students to try harder. Games may also make students think about solving problems in a new way, thus strengthening their higher-order thinking skills. Games may also support, reinforce, and accelerate the learning process (Hong, Cheng, Hwang, Lee, & Chang, 2009). Digital games can help teach in the educational setting by presenting students with abstract ways to think. With the aid of computer technology, many concepts can be visualized in ways, not possible as teacher-driven examples or narratives (Bai et al., 2012).

## Teachers' perspectives

It appears that IT has been imposed as a result of teachers' and policy-makers' enthusiasm for integrating technology. This enthusiasm may have been based on a naïve faith that technology will lend itself to deepening student knowledge and increase their

academic performance. This has led to a belief that technology means education in the classroom (Chen, 2011). There has been a widespread call for fresh approaches in the teaching field, and technology seems to be at the center of this change. With the world becoming more digitalized and connected, along with today's students embracing the technology that is available to them, it is no wonder that today's classrooms are becoming that way, as well (Wadmany & Kliachko, 2014). As the use of IT becomes global, it will continue to be incorporated into the K-12 education setting. Like entertainment and transportation, education will change, and it appears that it will become more technologically advanced through the coming years.

According to Bahr, Shaha, Farnsworth, Lewis, & Benson (2004), educators who have little to no experience with IT might be intrigued with the idea of integrating new approaches in the classroom; however, it can be a challenge for these teachers to implement it. A teacher may have to learn new software or how to use an entirely new interface (i.e., switching from PC to Mac). Integrating educational software could be traumatic for some teachers, especially if they have been teaching the same way for the past 20 years. Some teachers find technology to be scary, while others embrace it. Bahr, Shaha, Farnsworth, Lewis, & Benson (2004) state in their study that a teacher's attitude is the primary factor in how successful the teacher is in implementing technology in the classroom. If that teacher has a favorable view of the technology, it will have a higher rate of success of being implemented. According to Chen (2011), teachers believe that the use of technology is inevitable. Indeed, technology is everywhere in society, and there is no escape from it (Chen, 2011); therefore, it is not surprising to see it integrated into the classrooms.

Much of the research shows varying opinions about IT. Some teachers support it while others resist its integration into their classroom (Vanslyke-Briggs et al., 2015). When it is integrated into schools, teachers may feel intimidated by the new hardware; they must learn how to operate and maintain this new equipment. Developing the confidence to use a new tool takes time, and at first, teachers may focus their attention on improving their IT skills rather than meeting educational goals (Fragkouli & Hammond, 2007). While integration of IT in the classroom has a lot of benefits, there are some drawbacks to it, as technology tends to confuse, intimidate, and frustrate many educators and learners (Cavanaugh et al., 2011).

According to Badia, Meneses, and Sigales (2013), six characteristics of teachers may affect their educational use of IT in the classroom:

1. Their attitudes toward its usefulness
2. Their ability to innovate
3. Their expertise
4. Their attitudes in implementation
5. Their beliefs about teaching and learning
6. Their feelings in relation to the IT

According to these researchers, these six factors work together in determining when and to what extent teachers will implement IT in their classroom. These factors may vary among teachers. Deaney, Ruthven, and Hennessy (2005) suggest that teachers' incorporation of IT in their classroom should be measured in instructional practices, educational roles, and educational environmental settings. These authors also speculate that IT is integrated in the classroom is based on teachers' beliefs about students and

about what constitutes "good teaching" as well as the effect of technology on their students' lives.

The factors that go into deciding whether to incorporate IT can be viewed as intrinsic and extrinsic. They can be thought of as intrinsic in that a teacher's individual characteristics help determine whether to integrate the technology. On the other hand, the factors can be looked at as extrinsic in that the teachers' decision to incorporate IT will be motivation to help their students succeed.

According to Perrotta (2013), other researchers have noted that teachers who believe that they have to "accommodate" technology in their classroom may display negative reactions to the perceived "threats" it may present. They may feel as though the IT oversteps boundaries, slips into their practice, and shares in their control of the classroom. Wadmany and Kliachko (2014) have suggested that many teachers have a traditional conservative attitude towards education and thus have a negative feeling towards IT. Other teachers have claimed IT has provided a significant benefit in their teaching. It has added a broader array of content and resources to their classroom as well as contributed to students' understanding of the subject matter (Perrotta, 2013).

Other barriers are that teachers have to learn how to use the new technologies. According to Alnahdi (2014), teachers who have not been exposed to or trained how to use ITs will be more reluctant to use them. If teachers are not adequately trained on how to implement a device, they may not feel comfortable incorporating it and thus not want to use it in the classroom. Some researchers (Simion, Chirvasiu, & Michel, 2014) assert that teachers themselves have determined the instructional methods being utilized, and the type of learning they want to promote. These will then determine what types of IT

will be used in the classroom. For example, if teachers prefer a visual, hands-on approach, they may choose to use a whiteboard with markers (i.e., math problems). If the teacher likes to show videos to augment a lesson, a computer or monitor hook-up that is more technologically enhanced may be involved.

These findings come from instruction within the general education setting; however, some teachers may be reluctant to use IT in other disciplines where a strong focus on the STEM subjects may not be the focus, such as special education classrooms. In 2001, less than half of the college students in a teacher preparation institution reported having a course in assistive technology (Bouck & Flanagan, 2009). With a lack of training among teacher coming into the educational setting, and with current teachers who may not possess strong IT skills, many of the more seasoned teachers may choose a "traditional" way of teaching utilizing a marker and whiteboard, and opt out of going the technological route. This is simply due to the nature that that is not how they learned, nor was how they were taught.

A study conducted by Bataineh and Anderson (2015) found that younger teachers (ages 30 or younger) held the most positive attitudes about technology while the teachers with the most teaching experience reported the lowest attitude scores when it came to technological usage. This is congruent with other literature that states that teachers with long teaching experience are reluctant to accept digital change, in part because they are not as confident in their technological skills. The younger teachers, who have grown up in a digital age and are used to digital technology, have an advantage over those teachers who did not grow up using such techniques.

*Teacher perspectives*

Teachers' attitudes toward the implementation of IT were found to be mostly positive in one study (Pamuk, Cakir, Ergun, Yilmaz, & Ayas, 2013). According to Pamuk et al. (2013), the majority of the teachers in their study had positive things to say about using IT in their classrooms. When IT was implemented, the technology enhanced the lessons and made for a better learning environment for the students. Flanagan, Bouck, and Richardson (2013) echoed these remarks, stating that the teachers in their study asserted that IT was effective in the classroom. However, both studies mention that a significant hindrance to the use of IT were the inevitable technical problems. Instructional technology may sound good in theory, but there will be times where it fails. One example noted by Pamuk et al. (2013) is that touch screens would often fail and data transfer between instructor and students was often not successful. Lecture notes were sometimes lost as a result of automatic updates to the software. Teachers who store their entire lessons digitally rely on technology to work, and if it should fail, have no way of retrieving their lessons for class. Flanagan et al. (2013) reported that technical problems using IT interfered with the student learning in class. When technology does not work, it puts a burden on those trying to teach and on those trying to learn.

*Students and access to technology*

According to Vanslyke-Briggs, Hogan, Waffle, and Samplaski (2015), implementing technology in the classroom is not an option. The young people of today, or "digital natives," have grown up with technology their entire lives. It is a regular part of their daily routine. Because of the younger generation's greater experience with technology, they can access it more quickly and gain more information than those with

less experience (Reinhart, Thomas, & Toriskie, 2011). Digital literacy has become an essential life skill, technology competence bringing significant benefit to disadvantaged groups, therefore allowing these groups to be included in society (Vanslyke-Briggs et al., 2015). The addition of IT has been shown to increase student-centered teaching, enhance cooperative learning and project-based education, improve teacher/student relationships, enhance home-school relationships, bridge the digital divide, and help with special needs students (Cavanaugh et al., 2011). For these reasons, it is imperative that K-12 classrooms incorporate IT within their classrooms.

One of the most significant sources of information in recent decades, which has contributed to the advancement of IT, is the Internet (Wen, Chuang, & Kuo, 2012). With the inclusion of the Internet, students can now research an almost infinite array of subjects at their fingertips. They can reach out and talk to cohorts across the globe in a matter of seconds. Researching for academics is now easier than ever, and students do not even need to leave their homes to research assignments. Developing proficiency with technological tools in twenty-first-century readers and writers allows them to be better equipped to handle the responsibilities of the global community (Vanslyke-Briggs et al., 2015). And as more students graduate, what they learn from the classrooms will carry into the workforce.

*E-books*

Another idea that has recently been suggested is the use of electronic textbooks. Some researchers have suggested that electronic textbooks will eventually replace paper-based textbooks (Lee, Messom, & Yau, 2013; Wen et al. 2012). There are several advantages to having an electronic copy of a textbook for a young student:

1. Multimedia contents, such as video clips, animations, and education-based games
2. Content customized by the teacher to be relevant to each individual student's needs
3. A teacher's inclusion of different formats to reach different learning styles or skills
4. Less weight on the student (rather than carrying large loads of heavy books)
5. Backup and e-text replacement if losses occur
6. Fast updates to the latest information

Electronic textbooks provide students access to the most current information and electronic textbooks can be more entertaining and engaging than printed text. Additional factors favoring the adoption of electronic textbooks are the lower price, format of content, service reliability, the enhanced improvement and accuracy of current content, increasing life of ownership, improved readability, and copyright protections (Lee et al., 2013). Research has also indicated that the addition of electronic textbooks has improved the academic setting. For example, a study conducted by Wen et al. (2012) about the incorporation of electronic textbooks in a K-12 classroom setting found that learning motivation, learning outcomes, and attitude increased significantly. Electronic textbooks also enhanced learning outcomes. Despite the apparent advantages, however, to provide every student with a digital copy of a textbook would be very costly to a school district in that the schools would have to provide every student with a device to read the electronic textbook, as well as maintenance costs of the devices as well.

*Use of technology in the classroom*

Instructional technology allows students to learn differently and in new ways otherwise unattainable without the use of the technology (Hechter & Vermette, 2013). Studies have shown that teachers use IT in various ways (Cavanaugh, Dawson, & Ritzhaupt, 2011; Ritzhaupt, Dawson, & Cavanaugh, 2012). Some teachers use it to enhance lectures, create worksheets, develop student tests online, and reinforce classroom concepts. Other teachers may support learning by putting technology directly into students' hands. Hands-on use has many benefits (Cavanaugh et al., 2011). According to Ritzhaupt, Dawson, & Cavanaugh (2012), IT enhances students' ability to communicate, create, and collaborate with technology. It enriches higher-order thinking skills in collaboration with the course content. The use of IT can impact achievement in many academic areas. A study conducted by Cavanaugh et al. (2011) found that when teachers were given access to laptops for every single student in their classroom, positive changes happened in their school. Student attention, engagement, and interest increased. Students also worked independently and were able to use technological tools to research information individually (such as on the Internet).

Recent advancements in education, such as the integration of technology, offer real promise for improving the achievement of all students in the core subject areas (Lunenburg, 1998). It is clear that classrooms today are becoming more digitalized, and students are becoming more technologically advanced. Teachers must match their younger counterparts in the digital wave, and teach accordingly to the new generation of students. The integration of technology will allow them to explore new information and

learn on their own, and make discoveries that they may not have been able to grasp if they were sitting taking notes and listening to a lecture from a teacher.

*The cost of technology*

Not all students benefit from the use of technology, as it may be a luxury that only certain people can afford. Those who cannot afford it may have to go without, due to their inability to access the needed technology at home. Unfortunately, this means that children who come from families of low socio-economic status may be handicapped when it comes to digital learning. This handicap may appear in the school setting. There is a divide when it comes to technology use. Those who can afford the technology are more apt to use it and use it effectively. Those who are not as affluent may not have as much access to their schools and homes to such technologies (Ritzhaupt, Feng, Dawson, & Barron, 2013).

According to a study conducted by Reinhart et al. (2011), how technology is being implemented in K-12 schools to promote higher-order thinking vary significantly across school socioeconomic settings. Schools that have lower percentages of free or reduced lunches tend to make greater use of IT to develop higher-order thinking than do schools that have a higher rate of free or reduced lunches. (delete this part of sentence).

*Special education*

With the onset of inclusion classrooms, special education students are being immersed in the regular education setting. Special education teachers are often assigned to these classrooms to aid in support of these special education students. Sometimes these students may need more help than a special education teacher can provide. Instructional technology may be utilized to assist special education students.

Instructional technology may not only benefit those that are regular education students, but those who require special assistance. According to Balmeo, Nimo, Pagal, Puga, ArisDafQuiño, and Sanwen (2014), IT takes complex ideas and makes them simple; it also addresses the individual needs of each learner. Other researchers state that IT can give special needs students "equal opportunities in learning" and "facilitate daily life, maximize their independence, and promote self-advocacy" (Drigas & Ioannidou, 2013, p. 41). The instructional technology essentially makes the lives of special needs students better in the classroom and enhances the learning process.

According to Alnahdi (2014), it is imperative that today's students with disabilities are prepared to meet the increased academic challenges that they face within the school setting. Instructional technology can equalize the educational environment for these students to help them overcome the challenges and struggles that they face. Alnahdi proclaims that the introduction of IT in the classroom will enrich the curriculum that the special needs students receive and prepare them for the secondary school setting. What is more important is Alnahdi's claim that IT, if implemented correctly, can enrich these students' lives in school, and may have the potential to enable them to face academics with fewer problems and challenges.

Similarly, Marino and Beecher (2010) indicate that IT to be more effective than employing traditional instructional methods for special education students. Instructional technology may increase motivation and self-esteem, provide real-world experiences beyond the classroom, enhance skills after instruction has ended, and accelerate learning. Further, it was also discovered that when general education teachers were able to remove and overcome curriculum barriers with IT, these teachers were amazed by the special

education students' abilities to produce meaningful learning outcomes (Marino & Beecher, 2010). In this case, IT turned the classroom environment from a teacher-centered focus to a student-centered focus (Balmeo et al., 2014), in which students were more engaged and involved.

Despite the demonstrated benefits of using technology, one of the most significant problems facing special education teachers in the classroom is the lack of supplies (Balmeo et al., 2014; Özgüc & Cavkaytar, 2014). Though having IT in the classroom can be positive, but there are barriers to everyone's having access to it. For example, in a study conducted by Özgüç and Cavkaytar (2014), all nine special education teacher participants reported that they had problems with the lack of IT devices. Though the teachers were interested in letting their students learn with IT, supplies were limited or lacking. Similarly, in a study conducted by Balmeo et al. (2014), it was limited because there were no permanent computers set up in the special education students' classrooms. The school where this study was conducted had limited funds, and it was not feasible for every teacher to have access to instructional technology materials for their students.

With special education students' need for IT to succeed, it would appear that the implementation of IT in special education classrooms would be mandatory. The use of assistive technology, for this population, takes on the form of aids not seen in the regular education classroom. It can be a digital pad to assist writing skills for those students who need help in writing skills, a game for the hearing impaired, or some visual cue for those students who may be visually impaired (Okolo et al., 1989). When the phrase "instructional technology" is used, many people think of SMART boards, or computers with CD-ROMS, or DVD players (Pamuk et al., 2013). However, to special needs

students, it can mean a different set of technology, to help them get by in their daily class schedules. What regular education students need to help them succeed in the classroom is a different set of technology for what special needs students require to get by for the day (Özgüç & Cavkaytar, 2014).

However, the studies that focus on special education students and IT are not all consistent in their findings. Several studies have shown that IT does not make a significant impact on learning outcomes of students in the study when compared to a control group (Vasquez & Straub, 2012; Cheung & Slavin, 2013; Peterson-Karlan, 2011). On the other hand, it has been shown that there are some positives for IT when it comes to these special needs students. Some of these positives are that IT can assist special needs students in acquiring rapid technological advancement skills and these skills can be easily maintained for special education students. Some technologies can assist in motivating students to write, improve the physical process of writing and editing, and build self-confidence (Duhaney & Duhaney, 2000). Each special needs child is different, and assistive technologies must cater to their unique disability. Though it was shown in another study that the learning abilities of the special education students positively increased, the increases were not significant (Vasquez & Straub, 2012; Cheung & Slavin, 2013; Peterson-Karlan, 2011).

*Barriers*

Just as there are fundamental reasons teachers incorporate technology, there are also several factors as to why teachers decide not to include IT in their classrooms. These factors can be thought of as "barriers" to technology implementation. These barriers to integrating technology in the K-12 classroom can also be considered as

external and internal. External barriers are those such as access to technology, time, training, and support. Internal barriers can be thought of as teachers' beliefs about the use of technology in the classroom, teacher-student roles, and assessment practices (Hechter & Vermette, 2013).

Teaching is a time-consuming task. Even when teachers have the appropriate educational software and hardware in their classrooms, many teachers feel that they do not have the time to explore innovative techniques to implement them effectively in their classrooms (Winslow, Smith, & Dickerson, 2014). Many related factors have been identified by other researchers, who have reported that teachers are not integrating technology in their classrooms because of rigors of the job, time required to learn new technology, energy commitment, and hindrances in their day-to-day lives (Winslow et al., 2014); personal attributes such as adaptability to new technology, school infrastructure, school time usage, impaired school technology (Reinhart, Thomas, & Toriskie, 2011), lack of time and resources, school culture, teacher beliefs about technology, and monetary constraints (Hechter & Vermette, 2013). Due to these factors, some teacher participants have claimed that much of their IT goes unused (Winslow et al., 2014).

Despite the internal and external barriers facing them, some teachers are willing to incorporate IT into their classrooms. A teacher's willingness to use it seems to be the driving force behind using IT. In a study conducted by Hancock, Knezek, and Christensen (2007), it was concluded that the level of teacher interest in utilizing IT would significantly impact their decision to adopt technology into their classroom. Teachers who had a favorable view of IT and supported it were more likely to fully

integrate it into their classrooms, despite any barriers they might have faced (Hechter & Vermette, 2013).

Even when a teacher has a favorable view of technology, is well equipped, and is trained in how to use the IT correctly, frequently these teachers may not experience success implementing it because of class dynamics (Hechter & Vermette, 2013). A study conducted by Ritzhaupt et al. (2012) revealed that a teacher's level of education and experience teaching with technology is significantly and positively related to their use of technology. However, there was a negative correlation between the number of years taught and the use of technology in the classroom. Also, the level of the school's professional development and technology accessibility positively correlated to the teacher's use of technology in the classroom.

The equipment used for technology will wear out and break down over time, but the cost to maintain it is a small price to pay for the education of today's youth. Technology can be replaced, but a child's education cannot. If schools invest in their education with technology, schoolchildren can learn and grow in their schools more than their parent's generation could ever imagine (Winslow et al., 2014). Though costly, if K-12 schools in the United States started to invest in IT for classrooms, students graduating from high school would become computer literate and thus be better prepared for the workforce. It is not a secret that today's workforce demands a computer literate employee (Lewis, 1996), and it is the responsibility of schools and teachers to ensure that their students are equipped with the right credentials. If all schools were provided with IT technology, they would graduate students better prepared for the workforce.

*E-learning*

The term "e-learning" can be associated with several synonyms. Some of the synonymous terms are online learning, distance learning, computer-assisted instruction, computer-based instruction, technology-based instruction, technology-delivered instruction, computer-based simulation, and simulation games (Bell & Federman, 2013). Researchers in previous studies have concluded that most students welcome e-learning (Burgerova & Adamkovicova, 2013). Currently, due to barriers such as time, resources, and fluidity of technology, although many teachers and learners are keen to use IT in the classroom, most schools and institutions use only a fraction of the technology resources available (Cox, 2012). According to Killedar (2008), once a new technology has been implemented in a classroom setting, it must be used extensively before any gains and advancements from that technology can be seen.

The driving force to promote e-learning is to enhance and innovate education through the use of technology (Burgerova & Adamkovicova, 2013). Online teaching tools may be superior to traditional modes of instruction, in that they mesh well with several cognitive abilities, allowing for better memory storage (Miller, 2009). This has led to a migration of students from the traditional classroom to the online element (Bell & Federman, 2013). In modern education, computer-based teaching is becoming a requirement (Burgerova & Adamkovicova, 2013). There are advocates for and against the incoming trend of e-learning. Observing this trend is important because much of the higher order critical thinking skills that one obtains during college do not survive in long-term memory. Many instructors that are against it state that face-to-face instruction is superior and is the only real way to learn. Other instructors indicate that the virtual

classroom could supplement the traditional classroom, and may one day replace it (Angiello, 2010).

A study by the U.S. Department of Education has reported that students who have taken part, or all, of their classes online tend to outperform their traditional face-to-face classroom peers (Angiello, 2010), indicating that the introduction of e-learning enhancements to the educational settings may prove beneficial to the students in that classroom. Although e-learning is an attractive alternative for some students and may result in enhanced learning, studies have shown that most students prefer to be in the traditional classroom face-to-face with their peers. The preference towards the traditional classroom format may be a play on the essential human need to socialize (Geri, 2012).

*Video games*

In the last three decades, video games have been making a tremendous impact in the home entertainment industry. Adolescents and young adults have been playing video games at a higher rate in recent years, and the gaming industry is a profitable business market (Silver & McDonnell, 2007). At the same time, the K-12 education in the United States has been seen as declining in many people's eyes. Standardized testing and lack of funding have led some teachers to educate their pupils in a way that does not optimize students' learning potential (Starr, 2012). Though many educators and administrative staff may not think of combining video games and education, researchers have shown the relationship between educational software and the classroom setting may benefit students who need remedial help.

Researchers have cited the relationship between the addition of video-gaming technology to the classroom and the increased engagement, focus, and comprehension of

the students that are affected by the technology (Barab et al., 2009). If asked whether they would rather play video games or listen to a lecture, presumably, most teenagers would choose to play video games (Deubel, 2006). Video games are seen as fun and exciting compared to sitting in a classroom and taking notes and listening to a lecture (Spires, Rowe, Mott, & Lester, 2011). Traditionally, the classroom has been a rigorous and structured environment, and video games have been a foreign concept to the educational setting. Recent trends in technology and education are challenging these ideas, and video games may not be an alien concept in the classroom much longer.

According to Chaudhary (2008), teens are spending more time in front of the television sets than ever before, many of those hours playing video games. Educators have noted this trend and have wondered how to turn this movement into a positive in education. According to FAS Learning Technologies (2006), it was addressed that the need to meet the growing trends of today's students' diversity in active engagement and learning through technology may need to overlap (Spires et al., 2011).

According to Prensky (2001), digital game-based learning is about "fun and engagement, and the coming together of and serious learning and interactive entertainment into a newly emerging and highly exciting medium – Digital Learning Games" (p. 5). Prensky states that those who were over the age of 36 during the time of his publication (in 2000) grew up in a very different era than those who were still in school and under the age of 36. Those (corporate) men learned differently than those who were under 36 years of age (in 2000). Prensky claims the younger generation grew up with cell phones, computers, Google, the Internet, and other types of multimedia whereas the older generation did not have access to such informational technology. The

younger generation learned differently due to the availability of these technological devices and the connectivity these devices provided them to other people and information (such as the Internet) as they were growing up (Prenksy, 2001). Digital game-based learning is an option that many schools and institutions are heading towards, given its attractive features and potential results.

Advocating for the use of video games in education, Gee (2007) argues that today's academic cultures are not motivating and engaging students in ways that are educating our youth. In reference to video games, he suggests that when a game is boring and ill-conceived, a gamer does not want to play it, and it soon goes to the shelf where it will collect dust. Much like the classroom, when a lesson is not engaging, students will become bored with the lesson, and optimal cognitive engagement will not occur. Gee makes the argument that video games are not a waste of time but instead foster critical thinking and supplement teaching tools. Video games involve students and motivate them to complete a task (del Blanco, Marchiori, Martinez-Ortiz, Moreno-Ger, & Fernandez-Manjon, 2012). Gee suggests that if students in the academic setting had the ability to create their own knowledge and motivation to succeed as they do in a video game, more progressive learning would occur in the K-12 environment. Students would become less frustrated and would achieve at higher rates (Gee, 2007). In fact, according to Marino and Beecher (2010) games top the list of what K-12 teachers in the United States value as their pick for digital media. As education transforms over the next few generations, to become even more digital, video games may play a significant role.

*Assessing effectiveness*

According to Ferdig (2006), the main reason to evaluate IT is to ensure that a thorough analysis is completed to confirm that cognitive and affect changes have occurred. By doing so, this allows educators and researchers to determine which stronger and more definitive claims can be made because of the technology usage, and which ITs are not effective in instructing students in the classroom. The results are that educators are provided with more information about how to effectively implement IT usage in their classrooms, so that unintended consequences (such as misuses of school IT, and the waste of instructional time) are avoided.

Researchers Jones and Paolucci (2000) suggest the best way to evaluate IT is to look for common variables across pedagogical models. They suggest that a research framework must be developed where researchers can take in conclusions from appropriate applications of IT across various domains, such as teaching and learning requirements. There are several factors that Jones and Paolucci (2000) suggest for IT to be effective. These factors suggest that IT should:

1. Be appropriate for the learner's level of ability.
2. Be appropriate for the tasks associated with the course material to be learned.
3. Be appropriate for grouping arrangements and learning situations.
4. Be delivered in a way to transfer knowledge from the teacher to the learner (Jones & Paolucci, 2000).

Typically, studies measuring the effectiveness of IT examine the efficacy of the tool in teaching the students. This only measures knowledge gain, whereas usability studies are

concerned with the functionality of the technology (Jenkinson, 2009). According to Heinecke, Milman, Washington, and Blasi (2001), the questions researchers need to ask when assessing IT are two:

1. What is the role of evaluation towards furthering the goals of social programs?
2. How does technology impact student learning?

Assessing the effectiveness of implementing IT depends on how learning and technology are defined. If one views the goal of education as the "drill-and-skill" computer-based learning, where students have to regurgitate facts, then these pupils will show gains on standardized tests. However, if one views education as the production of students who can engage in critical, higher order, problem-solving skills, then an entirely different use of technology emerges. Based upon research conducted by Jenkinson (2009), McCombs (2000), and Heinecke et al. (2001) there are several fundamental questions to ask when assessing an IT tool:

1. In what ways can we do this that is both reliable, valid, and to some extent, transferable? (Jenkinson, 2009)
2. What changes in learning and performance outcomes can be observed with different technology uses and with different learners?
3. How can we measure the learning outcomes and are these generalized to specific settings?
4. What changes in teaching processes can be observed that enhance learning outcomes?
5. What changes in the learning context can be observed that create new partnerships and climates for learning?

*At-risk students*

At-risk students may gain different benefits from IT than their regular education peers. The implementation of IT to at-risk students may be more rewarding to these pupils than those that are not such a high risk. Kemker, Barron, & Harmes (2007) state that students who come from low socioeconomic status families, when given personal laptops to work within schools, attend school more regularly, have fewer tardies, and score higher on achievement tests. Katims & Diem (1996) find that at-risk students claim that technology makes "school more interesting." Another student in the study was quoted as saying, "It makes you want to come to class." When the researchers asked the students if the inclusion of IT would make school more positive for them, the students responded with "yes." The benefits of IT not only have positive aspects on the students' intrinsic motivators but the extrinsic ones, as well.

Flumerfelt & Green (2011) state that in a small class setting study done in an undisclosed location, 23 at-risk high school students were introduced to IT in their daily school routine. Ongoing exposure to this IT benefited the students in that it eliminated all class failures the first year. Year after year, implementation decreased student disciplinary referrals by 66%, and failure rates in school dropped (mathematics by 31%, English by 33%, science by 22%, and social studies by 19%). Tay & Lim (2010) state that 14 at-risk students in Singapore liked being immersed in instructional technology while they were at school. It allowed them to learn differently than the traditional teaching style, and it offered them a new way of learning on their own. These students thought it was more fun, and they saw it as a positive to their education. Girod, Martineau, & Zhao (2004) state that IT has made school a more positive experience for

the at-risk teens in their study. The implementation of IT introduced an alternative way of studying for the students, and a new way to embrace and do the assignments. This is out of the ordinary of the competitive nature of regular "traditional" school, and having this alternative study habit provided a different scholastic approach, which these at-risk students liked.

## Theoretical framework

The ideas and concepts behind effective IT can be tied to Piaget's Constructivism (Learning) theory.

### *Constructivist theory*

In Constructivist Theory, learners have to construct their own knowledge to solve problems presented by the environment. This theory emphasizes the processes by which children create and develop their ideas (Lunenburg, 1998). Constructivist learning theory states that students learn through a process in which they actively construct their knowledge by interacting with the subject matter (Razak & Connolly, 2013; Duhany & Duhaney, 2000; Yaman, 2010; Overby & Jones, 2015). The Constructivism Theory is a fit model for IT-enhanced learning because, with IT, students are encouraged to explore to solve problems, discuss ideas, and acquire new knowledge (Tucker, 2014).

### *Constructivist theory and teachers' perspectives*

Constructivist theory can play a part in teachers' perspectives when it comes to IT. Sang, Valcke, van Braak, & Zhu (2010) state that teachers who have more constructivist educational beliefs seem to be more willing to adopt IT into their classroom. These teachers with higher constructivist beliefs are more active IT users compared to those teachers with weak constructivist beliefs. Those teachers who teach in a way that helps

students learn from observation are already likely keen on the idea of implementing IT into their classrooms and are more willing to accept a technology-rich environment for their students.

Instructional technology can help educators augment constructivist approaches that may otherwise be difficult. Some ways that these goals can be achieved is through data analysis, presentation, and information accessibility (Becker & Ravitz, 1999). With new advances in technology happening continuously, these new developments can widen students' perspectives and new ideas to the classroom. Teachers who are already open to the idea of integrating technology in their classrooms are allowing their students the opportunity of such information access.

*Constructivism and technology in the k-12 classroom*

Technology is not a means of merely imparting knowledge and skills to students in the classroom. It is instead a supportive element of the learning context that includes student exploration, as well as in-depth problem-solving skills, authentic instructional tasks, cooperative learning, and teacher facilitation (Hauser & Malouf, 1996). Children accomplish this through the process of trying to make things happen and trying to manipulate their environment (Lunenburg, 1998). Kemp (2012) states that a constructivist classroom is one that provides students with opportunities to understand complex ideas about materials, and then draw meaningful conclusions from those understandings.

The addition of IT to the K-12 classroom has other benefits. It can help students in their curriculum, as well as be an aid to teachers while they are teaching. IT is not supposed to take the place of the teacher, but an assistive tool to aid in the learning

process. It is an enhancement to the classroom, to reemphasize concepts that the teacher has taught, and to provide more depth to the knowledge that the students have already acquired. If there is a puzzling concept or theme that students are having a hard time grasping, the implementation of IT can assist in clarifying and reinforcing those lessons.

*Constructivism and e-learning*

E-learning has been popular in many schools. The benefits of e-learning, which have been discussed, include costs, accessibility, and time management. Some studies have shown that classes with an online component have increased academic scores and that some students prefer online courses to face-to-face interaction due to accessibility. In constructivist e-learning environments, self-direction is seen to be an asset as students are afforded a greater opportunity to control their own education (Parkes, Reading, & Stein, 2013). This means that given a chance to undertake e-learning opportunities, students have a higher responsibility thrust upon them.

*Constructivism and video games*

When students play games to learn, they are in the game world and interacting socially and constructing knowledge of the subject matter. Through learning rules in the video game, they are learning processes of what is and is not acceptable. They are learning decision-making skills through this process, and learning what they can and cannot do. The students are developing new strategies and learning methods, and being educated regarding the game's rules (Wu et al., 2011). Whether a game is being played for fun or for educational purposes, games follow the rules. And without the rules, one cannot "win" at a game.

Game-based learning emphasizes the constructivist theory in that playing games to learn is a process of constant practice and interaction where the tasks progressively get harder, and the player gradually learns new rules and laws. The players engage in a learning setting through the activity they are involved in (Razak & Connolly, 2013). When a game gets more involved, and the solution is not as simple as it may seem, a player may need more complex techniques to master a skill. They will start to engage in more advanced forms of cognitive thinking to learn the gameplay (Ang, Avni, & Zaphiris, 2008).

In cognitive constructivism, the students (or players) learn rules by hypothesis testing, thoughtful reflection on and recollection of those rules, and rule construction. Each player constructs his or her own way of understanding the rules (Ang, Avni, & Zaphiris, 2008). Game-based learning is "learning through the game," rather than "learning to play the game." (Wu et al., 2011).

*Constructivism and at-risk students*

Zhao & Frank (2003) state that technology is most effective when it is implemented as continuous improvement to a setting, and not as a replacement. It has been shown through research (Kemker, Barron, & Harmes, 2007; Katims & Diem, 1996; Flumerfelt & Green, 2011; Tay & Lim, 2010; & Girod, Martineau, & Zhao, 2004) that at-risk students do better academically when IT is introduced to their educational environment. Through IT implementation, at-risk students have been known to thrive in an educational setting in which they would otherwise have failed, without receiving a diploma or certificate of completion. Traditional means of education did not work for them, and they were in danger of dropping out of school. Through IT implementation, at-

risk students can learn and participate in their lessons in a way not previously accessible to them. It has not replaced their education but enhanced it so that these students can graduate from high school with more skills that they would not have had otherwise. The introduction of IT has allowed them to thrive in a setting that they may have dropped out of had they not had the support provided to them.

## Summary

The implementation of IT benefits students in different ways based on their unique differences. While IT takes on many various forms and appearances, they all work towards the common goal of increasing student achievement both within the classroom and throughout society. Even though many concerns arise among all groups of stakeholders, often these can be traced back to fear of implementing a new instructional shift, which may be another short-lived trend. Often teachers and stakeholders do not realize the way technology affects their daily lives or how it has filtered down to the younger generations; creating a shift in the way they operate each day, nor do they realize the effect it can have on their learning.

# CHAPTER III - METHODOLOGY

This study seeks to examine the student reported attitudes of using IT to enhance their learning and to increase their academic achievement. This study specifically focuses on students who have either dropped out of high school or are at-risk of dropping out, and are enrolled in an alternative school designed for these students, as a means of helping them achieve the goal of graduating from high school before they have "aged out" of the public education system. The participants in this study are students between the ages of 16 and 21 years, who attend such a high school within a large district in Texas. More so, this study examines the extent to which students believe the integration of technology in the classroom has increased their academic achievement and motivation to learn and graduate from high school. This chapter reviews variables in this study, along with the data-collecting procedures.

## Research design

This study used a quantitative approach for data analysis. After data were collected, an analysis was conducted to determine the statistical significance of the results. The questionnaire utilized a Likert scale and was divided into sections that corresponded to the research questions being examined. This study was designed to use multiple linear regression of survey results to address three central questions. The first question was to determine the relationship between at-risk students' reported level of laptop integration and their reported level of learning. The second question that this study emphasizes is the relationship between at-risk students' perceived level of laptop proficiency and their perceived level of learning. The third focus of this study was to determine at-risk students' attitudes towards learning and laptop usage.

## Participants

The participants in this study were 74 students enrolled at an alternative high school in Texas. This school was selected because of the specific nature of the student body population; all students enrolled in the school are between the ages of 16 and 21 and have either dropped out or are in imminent danger of dropping out due to personal circumstances outside of school that are impacting their education. Additionally, these students must meet specific criteria to enroll within the school, such as a maximum number of credits completed. For those students who are minors and have parents/legal guardians, parental consent was obtained prior to the student participating in the study.

## Instrumentation

Data were collected via survey using a quantitative approach to determine at-risk students' beliefs regarding the use of instructional technology in their classroom. The survey instrument used to collect data in this study was constructed and tested by prior researchers and published in the European Journal of Contemporary Education (Appendix A); permission was obtained to use the survey instrument (Appendix B). The survey instrument provided detailed questions that support each of the research hypotheses posed in this study while gathering students' beliefs during the surveying process. Some questions were modified to better relate to the questions in the study. The developer of the questionnaire was apprised of and approved these changes. The questionnaire used in this study has two sections that were answered by every participant. Section A is the demographic section. In this part of the questionnaire, participants were asked to provide gender, age, marital status, job status, and whether or not they had any children. Section B includes questions regarding students' opinions about instructional

technology. In this section, four types of questions were included in the total 24 questions. The first type of question asked information about students' opinions about instructional technology usage. The second type of question asked about the students' self-reported levels of proficiency with the laptops. The third type of question asked about the students' perceived level of learning. The last type of question asked about the students' attitudes towards learning in the classroom with the laptops. The possible answer choices were based on a Likert-scale ranging from a 1 (Strongly Disagree) to a 5 (Strongly Agree). Upon completion of the questionnaires, it was found that the Cronbach's Alpha reliability coefficient analyzed by SPSS was .895.

All three research questions are addressed in Section B of the questionnaire. The following table shows the relationships between the research question and the items on the questionnaire.

Table 1

*List of Research Questions and Corresponding Survey Questions*

| Research Question | Instrument Item |
|---|---|
| 1. To what extent does the students' reported level of laptop integration in the classroom correlate with their level of reported learning? | 2, 4, 8, 9, 10, 15, 19, 20, 21 |
| 2. To what extent does the students' reported level of laptop proficiency correlate with their reported level of learning? | 1, 6, 7, 11, 12, 16 |
| 3. To what extent do the students' attitudes towards learning correlate with laptop usage? | 3, 5, 13, 14, 17, 18, 22, 23, 24 |

## Procedures

The researcher obtained permission to conduct his study by requesting and receiving written approval from the legal department of a selected district in Texas, as well as the principal of the selected alternative school (Appendix C, D & E). Once permission had been obtained from both the district and the principal, the researcher then sought permission from the University Institutional Review Board (IRB) to conduct his study. Upon receipt of IRB approval (Appendix F), the researcher made arrangements to meet with the faculty members during a faculty meeting, to explain the study, its procedures, and the targeted date for questionnaires to be completed by the students. Before the targeted date, a letter was sent home to students under the age of 18 to obtain parental permission for them to participate in the study, unless documentation on file indicates that they have been legally emancipated (Appendix G). Each student participant received a copy of the questionnaire, two copies of an informed consent letter, one to sign and one to keep (Appendix H & I), envelope (to seal their questionnaire), and instructions. Upon the receipt of their materials, participants were asked to keep a copy of the informed consent letter and to complete the questionnaire. Students were instructed to return their completed questionnaire to their teacher in the envelope provided, for return to the researcher. Once all completed survey instruments were collected, they were input into SPSS for analysis.

## Data analysis

This study examines the use of IT with the at-risk student population. Data for this study were collected for analysis by surveying students at an alternative school within a Texas school district. For the purpose of this study, a multiple linear regression

analysis was conducted to determine the relationship between variables. The independent variables were reported laptop usage in the classroom, students' self-reported proficiency with the laptops, students' self-reported learning gained from using the laptops while in the classroom, and the students' attitudes towards learning after laptop use was implemented in the classroom.

The data collected from the survey were input into SPSS for statistical analysis using multiple linear regression analysis to determine the relational strength between variables presented in this study. Sorting the data based on demographic information of the participants allowed the researcher to determine if particular trends might have influenced their response. Additionally, this allowed the researcher to determine if any significant areas could potentially be examined in future studies.

# CHAPTER IV – RESULTS

The purpose of this study was to examine at-risk student's opinions on the effectiveness of one-to-one instructional technology integration in their classroom environment. Questionnaires were distributed to classrooms in December 2017 at an alternative high school in Texas. To be eligible for the study, participants had to be full-time students enrolled in the night school program at the high school where questionnaires were distributed for their responses to be included in the study. Of the 94 students enrolled in the night program, 74 questionnaires (79%) were returned complete and valid for analysis. SPSS statistical analysis software was utilized to analyze all data in this study.

For any missing information not filled in by the participants, an option in SPSS called “replacing missing values via linear trend at point” filled in data. The first section was about demographics, and the second section asked questions about the participant's attitude towards IT integration, usage, and proficiency in the classroom setting. For the demographic item asking gender, 2.7% of participants did not select an answer. For the item asking age, all participants filled in their information. For the item asking if the participant had any children, 6.8% of the missing data were filled in. For the item asking about their marital status, 2.7% of the data were filled in. For the item asking about job status, 1.4% of the participants did not select a response. For the items asking about the student’s attitudes towards IT implementation, Table 2 below shows the percentages of missing data that were filled in by SPSS.

Table 2

*Percent of Missing Data Filled in (By Question)*

| Demographic Question | Percent |
|---|---|
| 1. I can learn easily when I use the laptop in class | 0% |
| 2. Classwork is easier when I use the laptop in class | 0% |
| 3. Writings, drawings, and figures are more understandable with the laptop | 1.4% |
| 4. Using the laptop in classes helps me learn better | 0% |
| 5. Learning is more fun with the laptop | 1.4% |
| 6. Giving presentation is easier using the laptop | 1.4% |
| 7. I have difficulty using the laptop | 0% |
| 8. Learning is fun when using the laptop | 1.4% |
| 9. The laptop encourages us to use the Internet to help us learn | 0% |
| 10. Our teachers let us use laptops in class to help us learn | 1.4% |
| 11. The laptop improves my interest for lessons | 0% |
| 12. It is too hard using the laptop in class | 1.4% |
| 13. The laptop improves my interest for lessons | 0% |
| 14. Lessons presented on the laptop do not interest me | 0% |
| 15. I learn easier with the laptop | 0% |
| 16. I can use laptops well in learning | 0% |
| 17. I don't need the teacher as much when I use the laptop | 0% |

Table 2 (Continued)

| Demographic Question | Percent |
|---|---|
| 18. The use of the laptop makes me work with my friends more | 1.4% |
| 19. Classes would be more difficult if we did not have laptops | 0% |
| 20. Lessons on the laptop are the same as what is in the textbook | 0% |
| 21. The laptop helps me when I am learning a new lesson | 0% |
| 22. I think that learning with the laptop will help with my success | 4.1% |
| 23. My eyes get tired when I look at the laptop screen for a long time | 0% |
| 24. My concentration is broken when I study with a laptop | 0% |

## Descriptive data

Participants were asked to answer only five demographic questions. The questions were intended to be general, as to not single out any individual participant. The five demographic items asked the participants' gender, age, if the participant had any children, marital status, and job status. Descriptive statistics were used to determine the demographic information provided by the participants.

The participants in the study were divided being male and female, with male participants being a slight majority (55.4%). Table 2 displays the results of the participants' responses to the demographic question asking their gender. There were only

two options to this study; other options such as transgender were not available for the participants to choose from.

Table 3

*Participant Gender*

| Response | Frequency | Percent |
|---|---|---|
| Male | 41 | 55.4 |
| Female | 33 | 44.6 |

The second demographic item asked the participant's age, and the options available ranged from 16 to 22 years. There were only 4 participants who were 16 years of age (5.4%), 16 students who were 17 years of age (21.6%), 31 students who were 18 years of age (41.9%), 15 students who were 19 years of age (20.3%), 6 students who were 20 years of age (8.1%), and 2 students who were 21 years of age (2.7%). The mode option was participants who responded with 18 years of age (41.9%), and the least chosen option were students who claimed to be 21 years of age (2.7%). Table 3 displays the results from the age demographic item analysis.

Table 4

*Participant Age*

| Response | Frequency | Percent |
|---|---|---|
| 16 | 4 | 5.4 |
| 17 | 16 | 21.6 |
| 18 | 31 | 41.9 |

Table 4 (Continued)

| | | |
|---|---|---|
| 19 | 15 | 20.3 |
| 20 | 6 | 8.1 |
| 21 | 2 | 2.7 |

The third demographic item asked the whether or not the participant had any children. The questionnaire stated that the child had to be already born (eliminating those who might be currently pregnant), to prevent any misunderstandings. Of those who answered this question, the majority said no (85.1%). Table 4 displays the result from this demographic item descriptive.

Table 5

*Participants with Children*

| Response | Frequency | Percent |
|---|---|---|
| No | 63 | 85.1 |
| Yes | 11 | 14.9 |

The fourth demographic item asked the participant's marital status. The four options provided in this questionnaire were whether they were single, engaged, married, or divorced. Participants stating that they were single was the most common answer with 61 responses (82.4%). Participants reported that they are engaged as the next most common response with eight responses (10.8%). The following most frequent response was participants who stated that they are married, with four of the participants (5.4%) identifying. The least typical response was one student who answered that they were

divorced (1.4%). A fifth option, widow, was not thought of during the time of the survey development since the participants were all very young, and this option was determined to be an unlikely selection. Table 5 displays the results from this analysis.

Table 6

*Marital Status of Participants*

| Response | Frequency | Percent |
|---|---|---|
| Single | 61 | 82.4 |
| Engaged | 8 | 10.8 |
| Married | 4 | 5.4 |
| Divorced | 1 | 1.4 |

The last demographic item asked for the participant's job status. The three options that the participants could choose from were if they were unemployed, if they worked part-time, or if they worked full-time. Participants who were unemployed were the most common answer with 30 responses (40.5%). Participants who chose the part-time employment status were the next most frequent responders with 29 responses (39.2%), and the least selected answer was participants who were full-time, with 15 responses (20.3%). Table 7 shows the results of this analysis.

Table 7

*Participant Job Status*

| Response | Frequency | Percent |
|---|---|---|
| Unemployed | 30 | 40.5 |
| Part-Time | 29 | 39.2 |

Table 7 (Continued)

| | | |
|---|---|---|
| Full-Time | 15 | 20.3 |

Part B of the questionnaire asked the participants about their opinions on IT integration in their educational setting. This part of the questionnaire had the participants use a Likert scale to respond with their choices, with options ranging from 1 to 5, with 1 being Strongly Disagree and 5 being Strongly Agree. Descriptive analyses were conducted on the items in the questionnaire, with results below. Question items are grouped based on the research question that they address.

Table 7 below shows the descriptive data from the first research question.

RQ1: Is there a statistically significant relationship between the students' reported level of laptop integration in the classroom and their level of reported learning?

The values reported in this section ranged from a minimum mean of 3.07 (*Classes would be more difficult if we did not have laptops*) to a maximum mean of 4.18 (*Our teachers let us use laptops in class to help us learn*). The standard deviations for this research question ranged from a minimum of 0.82 (*The laptop encourages us to use the Internet to help us learn*) to a maximum standard deviation of 1.23 (*Classes would be more difficult if we did not have laptops*). It was determined that each question had a mean that is over three (neutral) in this research question, implying that on average, the participants had at least a neutral or positive outlook on the relation between the integration of laptops in their classroom compared to their reported level of learning.

Table 8

*Research Question 1 Descriptive Data*

| Question | Mean | Standard Deviation |
|---|---|---|
| 2. Classwork is easier when I use the laptop in class | 3.35 | 1.13 |
| 4. Using the laptop in classes helps me learn better | 3.57 | 1.01 |
| 8. Learning is fun when using the laptop | 3.43 | 1.06 |
| 9. The laptop encourages us to use the Internet to help us learn | 4.01 | 0.82 |
| 10. Our teachers let us use laptops in class to help us learn | 4.18 | 1.00 |
| 15. I learn easier with the laptop | 3.69 | 0.89 |
| 19. Classes would be more difficult if we did not have laptops | 3.07 | 1.23 |
| 20. Lessons on the laptop are the same as what is in the textbook | 3.46 | 1.08 |
| 21. The laptop helps me when I am learning a new lesson | 3.57 | 1.05 |

The information below describes the responses to the items aligned with research question 2.

RQ2: Is there a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning?

The minimum mean score is 3.54 (*The laptop improves my interest for lessons*) and reaches a maximum mean score of 3.99 (*Giving presentation is easier using the laptop*). The standard deviations range from a minimum of 0.89 (*I can use laptops well in learning*) to a maximum of 1.15 (*I can learn easily when I use the laptop in class*). All mean values are above three (neutral), which implies that, on average, the participants have a positive outlook on their laptop proficiency concerning their reported level of learning.

Table 9

*Research Question 2 Descriptive Data*

| Question | Mean | Standard Deviation |
|---|---|---|
| 1. I can learn easily when I use the laptop in class | 3.66 | 1.15 |
| 6. Giving presentation is easier using the laptop | 3.99 | 0.94 |
| 7. I have difficulty using the laptop (reversed scoring) | 3.86 | 1.14 |
| 11. The laptop improves my interest for lessons | 3.54 | 1.04 |
| 12. It is too hard using the laptop in class (reversed scoring) | 3.74 | 1.12 |
| 16. I can use laptops well in learning | 3.81 | 0.89 |

RQ3: Is there a statistically significant relationship between the students' reported attitude towards learning and their level of reported laptop usage? The responses in this section range from a minimum mean score of 2.85 (*I don't need the teacher as much*

*when I use the laptop*) to a maximum mean score of 3.53 (*Learning is more fun with the laptop*). The standard deviations range from a minimum of 0.95 (*The laptop improves my interest for lessons*) to a maximum of 1.09 (*Lessons presented on the laptop do not interest me*). This research question is the only one for which some of the items on the questionnaire had a mean response below 3 (neutral). One of these items had to be reversed scored. The two questions that had means below neutral were Item 17 (*I don't need the teacher as much when I use the laptop*) and 23 (*My eyes get tired when I look at the laptop screen for a long time, reversed scored*). The responses to this question were similar to the first research question for which almost all the items had a standard deviation response over 1.00. The only exception is Item 13 (*The laptop improves my interest for lessons*) with a standard deviation of 0.95. Seven of the nine items (78%) in this section were at least three (neutral) on the Likert scale, implying that for the majority of the questions, the overall feedback was that of a positive one. These results indicate that for the majority of the items, the participants answered that they had a positive learning experience with their laptop usage in class.

Table 10

*Research Question 3 Descriptive Data*

| Question | Mean | Standard Deviation |
|---|---|---|
| 3. Writings, drawings, and figures are more understandable with the laptop | 3.12 | 1.07 |
| 5. Learning is more fun with the laptop | 3.53 | 1.08 |
| 13. The laptop improves my interest for lessons | 3.32 | 0.95 |

Table 10 (Continued)

| Question | Mean | Standard Deviation |
|---|---|---|
| 14. Lessons presented on the laptop do not interest me (reversed scoring) | 3.34 | 1.09 |
| 17. I don't need the teacher as much when I use the laptop | 2.85 | 1.04 |
| 18. The use of the laptop makes me work with my friends more | 3.20 | 1.03 |
| 22. I think that learning with the laptop will help with my success | 3.45 | 1.06 |
| 23. My eyes get tired when I look at the laptop screen for a long time (reversed scored) | 2.96 | 1.08 |
| 24. My concentration is broken when I study with a laptop (reversed scoring) | 3.49 | 1.06 |

## Statistical analysis

The collected data were analyzed further to determine statistical significance among the independent and dependent variable described in each research question. A multiple linear regression was conducted for each research question among the corresponding items using SPSS, and the results were further examined to determine if any statistically significant result could be identified from the data.

The first research question addresses the following: Is there a statistically significant relationship between the students' reported level of laptop integration in the classroom and their level of reported learning? Hypothesis 1 states that there is a

statistically significant relationship between the students' reported level of laptop integration and their reported level of learning. This question utilized a multiple linear regression using Item 4 (*Using the laptop in classes helps me learn better*) as the dependent variable. The independent variables were items 2, 8, 9, 10, 15, 19, 20, and 21 (see table 10).

When technology integration predicted reported learning, it was found that Items 2, 8, 9, 10, and 19 were not significant predictors (see Table 11). Items 15 (b=0.249, p=0.003), 20 (b=-0.227, p=0.007), and 21 (b=0.698, p<0.001) were significant predictors (see Table 11).

The analysis shows that there is a statistically significant relationship between students' reported level of laptop integration and their level of reported learning, $F(8,65)=20.53$, $p<0.001$ with an $R^2$ of 0.72. The analysis of this data supported the hypothesis for research question 1.

Table 11

*Research Question 1*

| Question | b | SE B | β | Sig. |
|---|---|---|---|---|
| 2. Classwork is easier when I use the laptop in class | .078 | .063 | .088 | .220 |
| 8. Learning is fun when using the laptop | .130 | .086 | .136 | .139 |
| 9. The laptop encourages us to use the Internet to help us learn | -.005 | .100 | -.004 | .957 |

Table 11 (Continued)

| Question | b | SE B | β | Sig. |
|---|---|---|---|---|
| 10. Our teachers let us use laptops in class to help us learn | -.045 | .083 | -.044 | .592 |
| 15. I learn easier with the laptop | .282 | .093 | .249 | .003 |
| 19. Classes would be more difficult if we did not have laptops | -.019 | .065 | -.023 | .775 |
| 20. Lessons on the laptop are the same as what is in the textbook | -.213 | .076 | -.227 | .007 |
| 21. The laptop helps me when I am learning a new lesson | .671 | .086 | .698 | <.001 |

Note: Dependent Variable - Using the laptop in classes helps me learn better

$p < .05$

The second research question addresses the following: Is there a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning? The hypothesis for this second research question was that there is a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning. This question utilized a multiple linear regression using question 1 as the dependent variable, and items 6, 7, 11, 12, and 16 as the independent variables (see Table 12).

When laptop proficiency predicted reported learning, it was found that items 7, 11, and 16 were not significant predictors (see Table 12). Items 6 (b=0.425, p=0.001) and 12 (b=0.329, p=0.008) were significant predictors (see Table 12).

The analysis shows that there is a statistically significant relationship between students' reported level of laptop proficiency and their reported level of learning, $F(8,65)=9.20$, $p<0.001$ with an $R^2$ of 0.404. The analysis presented by this data supported the hypothesis for research question 2.

Table 12

*Research Question 2*

| Question | b | SE B | β | Sig. |
|---|---|---|---|---|
| 6. Giving presentation is easier using the laptop | .518 | .151 | .425 | .001 |
| 7. I have difficulty using the laptop (reversed scoring) | .010 | .126 | .009 | .940 |
| 11. The laptop improves my interest for lessons | .135 | .129 | .121 | .300 |
| 12. It is too hard using the laptop in class (reversed scoring) | .337 | .123 | .329 | .008 |
| 16. I can use laptops well in learning | -.153 | .166 | -.118 | .358 |

Note: Dependent Variable - I can learn easily when I use the laptop in class

$p < .05$

The third research question addresses the following: Is there a statistically significant relationship between the students' reported attitude towards learning and their level of reported laptop usage? The hypothesis that corresponds to this research question states that there is a statistically significant relationship between the students' reported

attitudes towards learning and their level of reported laptop usage. For this research question, a multiple linear regression was utilized to analyze the data. Item 5 was used as the dependent variable, while items 3, 13, 14, 17, 18, 22, 23, and 24 were used as the independent variables (see Table 13).

When students' reported laptop usage predicted students' attitudes towards learning, items 13, 14, 17, 18, 23, and 24 were not significant predictors (see Table 13). Items 3 (b=0.342, p=0.003) and 22 (b=0.294, p=0.010) were significant predictors (see Table 13).

The analysis shows a statistically significant result in the relationship between students' reported attitudes towards learning and their reported laptop usage, $F(8,65)=8.06$, $p<0.001$ with an $R^2$ of 0.498. The analysis presented by this data supported the hypothesis for research question 3.

Table 13

*Research Question 3*

| Question | b | SE B | β | Sig. |
|---|---|---|---|---|
| 3. Writings, drawings, and figures are more understandable with the laptop | .343 | .112 | .342 | .003 |
| 11. The laptop improves my interest for lessons | .186 | .119 | .165 | .125 |
| 14. Lessons presented on the laptop do not interest me (reversed scoring) | -.026 | .108 | -.026 | .810 |

Table 13 (Continued)

| Question | b | SE B | β | Sig. |
|---|---|---|---|---|
| 17. I don't need the teacher as much when I use the laptop | -.122 | .103 | -.119 | .238 |
| 18. The use of the laptop makes me work with my friends more | .112 | .107 | .108 | .295 |
| 22. I think that learning with the laptop will help with my success | .298 | .112 | .294 | .010 |
| 23. My eyes get tired when I look at the laptop screen for a long time (reversed scored) | .072 | .100 | .073 | .469 |
| 24. My concentration is broken when I study with a laptop (reversed scored) | -.027 | .110 | -.027 | .806 |

Note: Dependent Variable - Learning is more fun with the laptop

$p < .05$

## Summary

The objective of this study was to examine at-risk student's opinions on the effectiveness of one-to-one instructional technology integration in their classroom environment. All variables and data cleaning were completed and analyzed statistically through SPSS. All research questions were found to have statistically significant results using an alpha of 0.05. Specifically, there were significant relationships between:

1. At-risk students' reported level of laptop integration in the classroom and their level of reported learning
2. At-risk students' reported level of laptop proficiency and their reported level of learning
3. At-risk students' reported attitudes towards learning and their level of reported laptop usage

From the descriptive data taken during the surveying process, the students have an overall positive outlook towards the laptop integration in their classrooms.

# CHAPTER V – DISCUSSION

The objective of this study was to determine the attitudes of at-risk students towards the implementation of technology in their educational setting. The general findings indicate that there are significant relationships between the use of instructional technology in the classroom and the attitudes of at-risk students in the present sample towards learning.

Based on research conducted by Kemker, Barron, and Harmes (2007), Katims and Diem (1996), Flumerfelt & Green (2011), Tay and Lim (2010), and Girod, Martineau, and Zhao (2004), in this study, the goal was to conduct research on at-risk students who were primarily first-generation immigrant students, where research had not been previously conducted before. Prior researchers have concluded that with the implementation of IT in the classroom setting, learning became more fun and it offered alternate way of learning (Tay & Lim, 2010). Girod, Martineau, and Zhao (2004) report in their research that IT allows students to learn differently, and was more favorable to the traditional ways taught in a regular classroom setting. These findings that IT made learning a positive experience were echoed in this study. The results also repeat what was concluded in research conducted by Katims and Diem (1996), where the researchers state that the students claimed that IT made school better for them. The students in the study had positive things to say about the IT integration in their classroom, and their attitudes were that it had enhanced their learning. This study by Katims and Diem also collected participant demographic information. However, these demographic data were not factored into any analyses, as it did not pertain to any statistical testing. The purpose of collecting this data were merely used to describe the sample.

## Conclusions and discussion

This study utilized quantitative methods of data measurement and analyses to examine three relationships: at-risk students' reported level of laptop integration in their classroom and their reported level of learning, at-risk students' reported level of laptop proficiency and their reported level of learning, and at-risk students' attitudes towards learning and their reported level of laptop usage. The data were analyzed to determine if there was a statistically significant relationship between these three relationships. Examining the results from the data provided insight to the overall effectiveness that IT integration has on some at-risk students. The results provide data to support the argument that education is heading towards a digital platform, and these at-risk students are embracing it.

### *Research question 1*

The first research question asked the following: is there a statistically significant relationship between the students' reported level of laptop integration in the classroom and their level of reported learning? The corresponding hypothesis to question one stated: there is a statistically significant relationship between the students' reported level of laptop integration in the classroom and their reported level of learning. The results from the data and the corresponding analyses determined that there is a statistically significant relationship between a student's reported level of laptop integration in the classroom and their stated level of learning.

The findings for this research question align with the research completed by Cavanaugh et al. (2011) that showed when students are all given laptops in the classroom, positive educational developments were observed in their learning. Hechter & Vermette

(2013) showed in their research that with the integration of IT in the classroom, students are able to learn differently and in new ways not attainable with just a traditional black or whiteboard. It enhances their learning.

The idea that the integration of IT to the educational setting of at-risk students is benefiting them could be theoretically explained by Piaget's Constructivism (Learning) theory. Applications of this theory state that learners have to construct their own knowledge before they can solve problems presented by the environment (Lunenberg, 1998) the students in this study must learn how to use the laptop. After the students learn how the computer works and how it can enhance their schoolwork, it can be used as a tool to improve their education and to improve their learning, not as a replacement for instruction. Researchers (Kemker, Barron, & Harmes, 2007; Katims & Diem, 1996; Flumerfelt & Green, 2011; Tay & Lim, 2010; & Girod, Martineau, & Zhao, 2004) have shown that through the implementation of IT in the educational setting, at-risk students had done better academically compared to when they were at a regular traditional school setting. The IT, in this case, has helped the at-risk students, and their knowledge and usage of learning how to use the IT has benefitted them.

*Research question 2*

The second research question poses the following: is there a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning? The corresponding hypothesis to this question states that there is a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning. The results from the data and the

corresponding analyses determined that there is a statistically significant relationship between a student's reported level of laptop proficiency and their stated level of learning.

The findings for this research question align with the research conducted by Reinhart, Thomas, and Toriskie (2011). These researchers demonstrated that those students who are more technologically adept are more likely to gain information quicker and faster than their counterparts who are not as experienced with digital technology. Those students who can use the laptops quickly and efficiently can learn with them efficiently without having to spend time troubleshooting how to do certain aspects of simple tasks. According to researchers Vanslyke-Briggs et al. (2015), those who can use technology in the classroom will be more prepared for being included in modern society than those that are not, since it is a fundamental life-skill that is needed in current day life.

The idea that laptop proficiency is related to learning can be tied back to Piaget's Constructivism theory. Researchers (Reinhart, Thomas, & Toriskie, 2011) demonstrated empirically that those students who are more adept at learning and knowing how to use a computer are more able to do the classwork. This idea may encourage others who are not as skillful in their computer skills to learn to catch up or ask their proficient counterparts for help so they, too, can be skillful. Researchers (Vanslyke-Briggs, Hogan, Waffle, and Samplaski, 2015; Vanslyke-Briggs et al., 2015) have suggested that today's younger generation has more significant experience with technology, growing up with it all their lives, and therefore are more proficient with it. Due to this, it must be implemented in the classroom. Those who are not proficient with technology are disadvantaged not only at school but also in society and the workforce, as well. There is an incentive for students

to learn how to use IT in the school setting, not only at school but for society and the workplace, as well.

*Research question 3*

The third research question addresses the following: is there a statistically significant relationship between the students' reported attitude towards learning and their level of reported laptop usage? The corresponding hypothesis stated that there is a statistically significant relationship between the students' reported attitude towards learning and their level of reported laptop usage. The results from the data and the corresponding analyses determined that there is a statistically significant relationship between a student's reported attitude towards learning and their level of reported laptop usage.

The results for this research question align with the research conducted by Cavanaugh et al. (2011) in that when every student had been issued a laptop, academic achievement and overall school demeanor improved for students. Students are more engaged in their work and had a deeper appreciation for their schoolwork. Prensky (2001) claims that today's younger generation grew up in a world with cellular phones, computers, Google, the Internet, and other types of multimedia platforms whereas the older generation did not have such luxuries. If these same younger students are presented with the same stimuli in the school setting, it will be something they are similar with, and therefore will learn better because it will be on a platform that they naturally engage on.

The idea that laptop usage is related towards attitudes toward learning can be tied back to Piaget's Constructivism theory. The more students use a laptop, the more proficient they are with it. The student acquires knowledge as they use it, or use

reinforces skills that they have learned beforehand. This idea is the underlying theme of the Constructivism theory; the student is encouraged to explore to solve problems, discuss potential solutions when they have a problem, and acquire new knowledge when presented with new ideas (Tucker, 2014). As the student manipulates the laptop by learning with it, they will become more confident, while building their knowledge by interacting with it (Razak & Connolly, 2013; Duhany & Duhaney, 2000; Yaman, 2010; Overby & Jones, 2015).

## Limitations

This study had several limitations. The study was conducted at an alternative school at a large school district in Texas, and all 74 participants were students at the night school program at the selected school. The results of the study are only a reflection of those students, and may not be generalizable to all at-risk high school students throughout Texas, much less the majority of the United States. The data were collected during one nine-week period, as due to the nature of the high school, the composition of the school changes every nine weeks. The data are only representative of the second nine-week cycle of the 2017-2018 academic school year.

The items on the questionnaire were intentionally asked using very simple English, and due to the some of the participants being English language learners. Some of the questions they may have answered may not have been entirely understood by the participants, despite all attempts to make the items as simple as possible. Due to this, there may have been some mistranslation between the questionnaire and the participant filling it out, and their not fully understanding the items.

## Recommendations for Policy or Practice

The generation of students in today's classroom is becoming increasingly digital. They have grown up with digital technology their entire lives and have the knowledge of how to access information quickly and gain information via technology more accessible than those who have not grown up with it in their earlier years (Reinhart, Thomas, & Toriskie, 2011; Prensky 2001, Vanslyke-Briggs, Hogan, Waffle, & Samplaski, 2015). As a result, it is reasonable that today's K-12 classrooms should be equipped IT within their walls and in their curriculum (Cavanagh, Dawson, & Ritzhaupt, 2011; Laurillard, 2007; Chen, 2011). Instructional technology is not the next educational "buzz word," as studies have shown it to enhance the learning process (Puckett, 2013), improve academic test scores (Shaw, Giles, & Hibberts, 2013), reach different types of learning styles (Puckett, 2013; Hechter & Vermette, 2013), and strengthen problem-solving skills (Bai, Pan, Hirumi, & Kebritchi, 2012, Hong, Cheng, Hwang, Lee, & Chang, 2009).

Implementing IT in the K-12 setting, especially for at-risk students may benefit all stakeholders involved, outcomes that are both intended and unanticipated. The intended benefit is that the students (at-risk or not) will learn better through the integration of the IT in the classroom. Studies have shown that with the implementation, at-risk students will enjoy school more (Kemker, Barron, & Harmes, 2007; Katims & Diem, 1996, Tay & Lim, 2010; Girod, Martineau, & Zhao, 2004), earn higher grades (Kemker, Barron, & Harmes, 2007; Flummerfelt & Green, 2011), and have fewer disciplinary referrals (Flummerfelt & Green, 2011). Thus, by integrating IT in the classroom, not only will it assist the at-risk students to achieve better academic scores, it will help them indirectly by keeping them in school, and ultimately to graduate from high

school. The addition of IT to the classroom will not only help them improve their grades while assisting them to earn their high school diploma.

This study provides information about at-risk students' opinions about the laptop integration at their high school, based on the specific variables. The study provides descriptive information on the students who participated in the study. The participants' responses indicated that there was a statistically significant relationship between a student's reported level of laptop integration in the classroom and their learning, and a student's reported level of laptop proficiency and their learning, along with a student's reported attitude towards learning and their level of laptop usage.

## Recommendations for Future Research

This study utilized a one-time 29-item questionnaire and did not necessarily go into great depth about the participants' opinions about IT in the classroom. Other variables to consider for a future study could be variables such as: how often the participant uses the IT, how comfortable they feel using the IT, if they do other things on the IT when the teacher is not looking (such as browse websites instead of doing work), and if they use the IT at home.

Suggestions for additional research include conducting a qualitative study that focuses on a small group of students, rather than the entire school as, to gather more in-depth, rich information. Additional research will allow researchers to fully understand what participants are feeling about the IT with open-ended questions, rather than a questionnaire, that they can lead through with follow-up questions. Additionally, this type of study could be extended to be a longitudinal study. The researchers can then study how the participants think that the IT has benefitted them over the course of the

school year, and even from teacher to teacher, as they transition between semesters. The study could continue after the students graduate, and the researchers could study what job opportunities the participant chose, if they went to college or a trade school, or even if they involved in any criminal activity.

Another recommendation could be that since this study was conducted only using one school at one instance in time, a bigger sample size of at-risk students could be utilized for a future study, possibly across different school districts, or even states. This will give a more comprehensive understanding of at-risk students, and will be more generalizable to the whole US.

An additional type of future study could be to do a quasi-experimental study where researchers study at-risk students in relation to regular education students. The researchers could have two time segments, and give one group (at-risk vs. regular education) laptops while the other group does not receive this instructional aid, and after a period of time (such as a nine-week grading period), the two groups switch, meaning the group that did not have the laptops now get them and the group that had them does not get to use them anymore. Researchers could track grades and student motivation and see how well students excel in the presence of laptops, and see how the students react to their absence.

## Summary

This study examined the relationship between IT integration in the classroom and at-risk students' opinions about it. The data were collected using a quantitative survey instrument that was modified based on prior research completed by Duran & Aytac (2016). The survey instrument consisted of 29 items divided into two sections. The first

section consisted of five demographic questions that were used solely for informational data. The second section of the instrument consisted of 24 Likert items.

This study examined three research questions, which were developed by the researcher:

1. Is there a statistically significant relationship between the students' reported level of laptop integration in the classroom and their level of reported learning?
2. Is there a statistically significant relationship between the students' reported level of laptop proficiency and their reported level of learning?
3. Is there a statistically significant relationship between the students' reported attitude towards learning and their level of reported laptop usage?

Data from the questionnaires were analyzed through SPSS using multiple linear regression and determined that all three research questions had statistically significant outcomes. The results from this study could be utilized to help school leaders understand that at-risk students benefit from the implementation of IT in the school setting, and it aids in their educational growth. This study can also be used by future researchers to obtain data, insight, and suggestions for future research questions concerning this area of research.

APPENDIX A – Survey Instrument

Gender: Male Female

Age: 16 17 18 19 20 21

Do you have any children (already born)? Yes No

Marital status: Engaged Single Married Divorced

Job status: Part-time Full-time Unemployed

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 1. I can learn easily when I use the laptop in class | 1 | 2 | 3 | 4 | 5 |
| 2. Classwork is easier when I use the laptop in class | 1 | 2 | 3 | 4 | 5 |
| 3. Writings, drawings, and figures are more understandable with the laptop | 1 | 2 | 3 | 4 | 5 |
| 4. Using the laptop in classes helps me learn better | 1 | 2 | 3 | 4 | 5 |
| 5. Learning is more fun with the laptop | 1 | 2 | 3 | 4 | 5 |
| 6. Giving presentation is easier using the laptop | 1 | 2 | 3 | 4 | 5 |
| 7. I have difficulty using the laptop | 1 | 2 | 3 | 4 | 5 |
| 8. Learning is fun when using the laptop | 1 | 2 | 3 | 4 | 5 |
| 9. The laptop encourages us to use the Internet to help us learn | 1 | 2 | 3 | 4 | 5 |
| 10. Our teachers let us use laptops in class to help us learn | 1 | 2 | 3 | 4 | 5 |
| 11. The laptop improves my interest for lessons | 1 | 2 | 3 | 4 | 5 |
| 12. It is too hard using the laptop in class | 1 | 2 | 3 | 4 | 5 |

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 13. The laptop improves my interest for lessons | 1 | 2 | 3 | 4 | 5 |
| 14. Lessons presented on the laptop do not interest me | 1 | 2 | 3 | 4 | 5 |
| 15. I learn easier with the laptop | 1 | 2 | 3 | 4 | 5 |
| 16. I can use laptops well in learning | 1 | 2 | 3 | 4 | 5 |
| 17. I don't need the teacher as much when I use the laptop | 1 | 2 | 3 | 4 | 5 |
| 18. The use of the laptop makes me work with my friends more | 1 | 2 | 3 | 4 | 5 |
| 19. Classes would be more difficult if we did not have laptops | 1 | 2 | 3 | 4 | 5 |
| 20. Lessons on the laptop are the same as what is in the textbook | 1 | 2 | 3 | 4 | 5 |
| 21. The laptop helps me when I am learning a new lesson | 1 | 2 | 3 | 4 | 5 |
| 22. I think that learning with the laptop will help with my success | 1 | 2 | 3 | 4 | 5 |
| 23. My eyes get tired when I look at the laptop screen for a long time | 1 | 2 | 3 | 4 | 5 |
| 24. My concentration is broken when I study with a laptop | 1 | 2 | 3 | 4 | 5 |

APPENDIX B – Permission to Use Instrument

**From:** tufan <tufana60@gmail.com>
**Sent:** Sunday, January 29, 2017 7:32 AM
**To:** Christopher Harper
**Subject:** YNT: Your Journal Article Survey

Hello Harper
You can use the Scale. No problem.
Take it easy
Assoc. Prof.Dr Tufan Aytaç
Bozok University
Turkey

Samsung cihazımdan gönderildi

-------- Orjinal mesaj --------
Kimden: Christopher Harper <charper_@hotmail.com>
Tarih: 29 01 2017 05:08 (GMT+02:00)
Alıcı: muharremduran@gmail.com, tufana60@gmail.com
Konu: Your Journal Article Survey

Good evening. My name is Chris Harper. I am a graduate student working on my PhD in research and statistics at The University of Southern Mississippi (currently residing in Texas). I am finished with my coursework, and am working on my dissertation. I came across your journal article, and found your questionnaire embedded in it. The topic of my dissertation is about assessing at-risk students' attitudes about the effectiveness of instructional technology in the classroom. I was wondering if you would grant me permission to use your questionnaire in my dissertation. I would make slight changes to it (the school I'm using uses laptops instead of tablets). If you grant me permission, please let me know. If you choose to deny me permission, I understand, and thank you for your consideration. Thank you, and have a great day!
Chris Harper
**From:** Muharrem Duran <muharremduran@gmail.com>
**Sent:** Sunday, January 29, 2017 8:29 AM
**To:** Christopher Harper
**Subject:** Re: Your Journal Article Survey

Dear Chris,

*Firs of all, I wish you great success in your work, please cleare up your desire, ie, what your subject is about, which questionnaire you want to use. If you mention about PCK questionnaire, it was prepared in turkish language because of that it is not beneficial for*

*your work.*

*Have a nice day!*

*Muharrem Duran*

I wish you great success

2017-01-29 6:08 GMT+03:00 Christopher Harper <charper_@hotmail.com>:
Good evening. My name is Chris Harper. I am a graduate student working on my PhD in research and statistics at The University of Southern Mississippi (currently residing in Texas). I am finished with my coursework, and am working on my dissertation. I came across your journal article, and found your questionnaire embedded in it. The topic of my dissertation is about assessing at-risk students' attitudes about the effectiveness of instructional technology in the classroom. I was wondering if you would grant me permission to use your questionnaire in my dissertation. I would make slight changes to it (the school I'm using uses laptops instead of tablets). If you grant me permission, please let me know. If you choose to deny me permission, I understand, and thank you for your consideration. Thank you, and have a great day!

Chris Harper

## APPENDIX C – Sample Letter to Superintendent

Christopher J. Harper
7525 Holly Hill Dr. #32
Dallas, TX 75231

Superintendent
Fort Worth Independent School District

Dear Superintendent,

I am a doctoral candidate at the University of Southern Mississippi under Dr. Kyna Shelley, and an employee of Fort Worth ISD. I am writing to request your permission to distribute questionnaires to your teachers at Success High School. The information that I am collecting with these questionnaires will be shared with my dissertation committee and will be used in my dissertation.

My research is seeking to assess at-risk students' opinions of the effectiveness of the use of Instructional Technology. The data being collected with these surveys will remain confidential and will not identify any teacher or student. This research will not interfere with classroom instruction or with the daily operations of participating schools and teachers. The survey will take approximately 10 minutes to complete. I plan to begin collecting data in March 2017 and to be completed by June 2017. All precautions will be taken to ensure parent permission is obtained for participation of students who are under the age of 18. Participation is completely voluntary and participants may withdraw at any time without penalty or prejudice to the participant. There is no inherent risk associated with being a participant of this survey. All surveys collected will be destroyed by a shredder upon completion of the study. The purpose of this study is to determine if students have the attitude that the implementation and use of IT in the classrooms has increased the effectiveness of their instruction and the overall academic achievement of their students.

In order to conduct this research I am required to follow all of the ethical guidelines of research as proposed by the Institutional Review Board's Human Subject Committee at the University of Southern Mississippi. My application to this committee is pending the receipt of your consent letter.

Thank you for your time and consideration in allowing me to collect data from the teachers in your district. If your decision is to grant me permission, please respond on your district's letterhead. Thank you again.

Sincerely,

Christopher J. Harper

APPENDIX D – Fort Worth ISD Approval Letter

**Stacy M. Burrell, Ph.D.**
**Director, Grants Compliance and Monitoring**
100 N. University Drive, Suite SW212A, Fort Worth, Texas 76107
OFFICE 817.814.1850 FAX 817.814.1855
askeval@fwisd.org

Fort Worth INDEPENDENT SCHOOL DISTRICT
Grants Compliance and Monitoring

Date: November 7, 2017

To: Christopher Harper

Re: Request for External Research with Fort Worth ISD (002-18 )

Your application to conduct research in FWISD has been reviewed. We are pleased to inform you that your study, "Students' Attitudes of the Effectiveness of Instructional Technology in the K-12 Classroom". (002-18), has been approved.

You are free to begin your study. Please remember that all data collected in FWISD schools are protected by the Grants Compliance and Monitoring CERR and IRB functions. This authority supersedes any contractual agreement or Memorandum of Understanding (MOU) per FWISD-Legal.

You agree to keep all data confidential which includes creating special subject numbers, keeping data safeguarded, not sharing or reporting individual data to third parties for research or other purposes, and using the data only for agreed upon research and program development purposes. You understand and agree that no confidential information regarding any individual teacher or student will be disclosed in any document intended for public disclosure.

Although this letter constitutes approval from the Grants Compliance and Monitoring Department, you must have principal's consent before you can start your study. Teacher and student participation in your study is strictly voluntary.

Please send us results and/or publications resulting from your study. We wish you the best in your research. Please contact AskEval@fwisd.org if you have further questions.

Sincerely,

Stacy M. Burrell, Ph.D.
Director, Grants Compliance and Monitoring

CC: Tracy Marshall, Executive Director, Grants Development, Management and Monitoring

PREPARING all STUDENTS FOR SUCCESS IN COLLEGE, CAREER AND COMMUNITY LEADERSHIP.

## APPENDIX E - Sample Email To The Principal

Dear Principal,

I am a doctoral candidate at the University of Southern Mississippi under Dr. Kyna Shelley. I recently received permission from the superintendent to collect research data from your school. I am writing to request your permission to distribute questionnaires to the teachers at your schools. The information that I am collecting with these questionnaires will be shared with my dissertation committee and will be used in my dissertation.

My research is seeking to analyze at-risk students' attitudes of the effectiveness of the use of instructional technology. The data being collected with these surveys will remain confidential and will not identify any students that are participating in this study. This research will not interfere with classroom instruction or with the daily operations of participating schools and teachers. The survey will take approximately 10 minutes to complete. I plan to begin collecting data in May 2017 and to be completed by June 2017. Participation is completely voluntary and participants may withdraw at any time without penalty or prejudice to the participant. There is no inherent risk associated with being a participant of this survey. All surveys collected will be destroyed by a shredder upon completion of the study. The purpose of this study is to determine if teachers perceive that the implementation and use of IT in the classrooms has increased the effectiveness of their instruction and the overall academic achievement of their students.

In order to conduct this research I am required to follow all of the ethical guidelines of research as proposed by the Institutional Review Board's Human Subject Committee at the University of Southern Mississippi. I am attaching a copy of the IRB approval letter for your review.

Thank you for your time and consideration, I hope you will allow me to attend a faculty meeting to distribute and collect my survey, or help me identify a designated individual to do this on my behalf. Please indicate your approval by responding to this email.

Sincerely,
Christopher J. Harper

APPENDIX F - IRB Approval

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

**INSTITUTIONAL REVIEW BOARD**
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the “Adverse Effect Report Form”.
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 17120706
PROJECT TITLE: Assessing at-risk students' attitudes toward the implementations of instructional technology
PROJECT TYPE: Doctoral Dissertation
RESEARCHER(S): Christopher J Harper
COLLEGE/DIVISION: College of Education and Psychology DEPARTMENT: Educational Research and Administration FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 12/12/2017 to 12/11/2018

**Lawrence A. Hosman, Ph.D.**
**Institutional Review Board**

APPENDIX G - Parent Consent Letter

**RETURN TO RESEARCHER**

Your student has been invited to participate in the study titled **"Students' Attitudes of the Effectiveness of Instructional Technology in the K-12 Classroom"** to be conducted at my school.

I understand the purpose of this project will be to measure the attitudes of students of the effectiveness of the use of technology within their classrooms. My student will be participating in this study by completing survey and returning it to their teacher.

The potential benefits of this study includes the further exploration of the benefits provided by the use of instructional technology and its effect on instructional delivery and student achievement.

I understand that by agreeing for your student to complete the survey, their responses will be used as part of this study. At no time during the study will students be asked to identify themselves. The only data collected for identification purposes are the demographic questions asked within the survey to identify subgroups within the data.

All information collected for this study will be used for data analysis. This information may potentially be used for publication and presentation. There are no risks or inconveniences anticipated to students who participate in this study. Participation is completely voluntary and will not be used in conjunction with a student's evaluation or academic status. There will be no penalty if you or your student elect to withdraw permission prior to or while completing the survey.

If further information is needed in regards to this specific research study, I can contact Christopher Harper at 817-946-2319 or christopher.harper@fwisd.org.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

I give permission for my student to participate in this study, please sign the form below. A signature will indicate agreement to participate.

Student's Name: (Print) _____

Parent's Name: (Print) _____

Table A1. *Signature* _____ *(Date)* _____

APPENDIX H - Informed Consent To Be Returned

Consent to Participate Form

## RETURN TO RESEARCHER

My completion of the attached survey indicates that I have read the information provided below and have decided to participate in the study titled **"Students' Attitudes of the Effectiveness of Instructional Technology in the K-12 Classroom"** to be conducted at my school.

I understand the purpose of this project will be to measure the attitudes of students of the effectiveness of the use of technology within their classrooms. I will be participating in this study by completing the attached survey and returning it sealed to the designated individual in the envelope provided.

The potential benefits of this study includes the further exploration of the benefits provided by the use of instructional and its effect on instructional delivery and student achievement.

I understand that by completing the survey, I agree that my responses will be used as part of this study. At no time during the study will participants be asked to identify themselves. The only data collected for identification purposes are the demographic questions asked within the survey to identify subgroups within the data. The return procedure includes sealing your completed survey in the provided envelope to further ensure anonymity in order to prevent bias towards volunteer participation.

All information collected for this study will be used for data analysis. This information may potentially be used for publication and presentation. There are no risks or inconveniences anticipated to individuals who participate in this study. Participation is completely voluntary and will not be used in conjunction with a participant's evaluation or employment status. If a participant elects to withdraw their permission prior to or while completing the survey, there will be no penalty.

If further information is needed in regards to this specific research study, I can contact Christopher Harper at 817-946-2319 or christopher.harper@fwisd.org.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

If you wish to participate in this study, please sign the form below. A signature will indicate agreement to participate.

Participant's Name: (Print) _____

Signature _____ (Date) _____

APPENDIX I – Informed Consent To Be Retained

Consent to Participate

**KEEP FOR YOUR RECORDS**

My completion of the attached survey indicates that I have read the information provided below and have decided to participate in the study titled **"Students' Attitudes of the Effectiveness of Instructional Technology in the K-12 Classroom"** to be conducted at my school.

I understand the purpose of this project will be to measure the attitudes of students of the effectiveness of the use of technology within their classrooms.

I will be participating in this study by completing the attached survey and returning it sealed to the designated individual in the envelope provided.

The potential benefits of this study includes the further exploration of the benefits provided by the use of instructional and its effect on instructional delivery and student achievement.

I understand that by completing the survey, I agree that my responses will be used as part of this study. At no time during the study will participants be asked to identify themselves. The only data collected for identification purposes are the demographic questions asked within the survey to identify subgroups within the data. The return procedure includes sealing your completed survey in the provided envelope to further ensure anonymity in order to prevent bias towards volunteer participation.

All information collected for this study will be used for data analysis. This information may potentially be used for publication and presentation. There are no risks or inconveniences anticipated to individuals who participate in this study.

Participation is completely voluntary and will not be used in conjunction with a participant's evaluation or employment status. If a participant elects to withdraw their permission prior to or while completing the survey, there will be no penalty.

If further information is needed in regards to this specific research study, I can contact Christopher Harper at 817-946-2319 or christopher.harper@fwisd.org.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

# REFERENCES


Association for Educational Communications and Technology. (2008). *What is the knowledge base?* Retrieved 04/02, 2015, from http://www.aect.org/standards/knowledgebase.html

Alnahdi, G. (2014). Assistive technology in special education and the universal design for learning. *The Turkish Online Journal of Educational Technology, 13*(2), 18-23.

Ang, C. S., Avni, E., & Zaphiris, P. (2008). Linking pedagogical theory of computer games to their usability. *International Journal on E-Learning, 7*(3), 533-558.

Angiello, R. (2010). Study looks at online learning vs. traditional instruction. *The Education Digest,* 56-59. .

Badia, A., Meneses, J., & Sigalés, C. (2013). Teachers' perceptions of factors affecting the educational use of ICT in technology-rich classrooms. *Electronic Journal of Research in Educational Psychology, 11*(3), 787-808.

Bahr, D. L., Shaha, S. H., Farnsworth, B. J., Lewis, V. K., & Benson, L. F. (2004). Preparing tomorrow's teachers to use technology: Attitudinal impacts of technology-supported field experience on pre-service teacher candidates. *Journal of Instructional Psychology, 31*(2), 88-97.

Bai, H., Pan, W., Hirumi, A., & Kebritchi, M. (2012). Assessing the effectiveness of a 3-D instructional game on improving mathematics and achievement and motivation of middle school students. *British Journal of Educational Technology, 43*(6), 993-1003.

Baldwin, L. M., Metaxas, P. T., & Wood, W. J. (2000). Assessing IT. *166,* 1-17.

Balmeo, M. L., Nimo, E. M. A., Pagal, A. M., Puga, S. C., ArisDafQuiño, & Sanwen, J. L. (2014). Integrating technology in teaching students with special learning needs in the SPED schools in Baguio city. *The IAFOR Journal of Education, 2*(2), 149-178.

Barab, S. A., Scott, B., Siyahhan, S., Goldstone, R., Ingram-Goble, A. A., Zuiker, S. J., et al. (2009). Transformational play as a curricular scaffold: Using videogames to support science education. *Journal of Scientific Educational Technology, 18,* 305-320.

Bataineh, M.A. & Anderson, S. (2015). Jordanian social studies teachers' perceptions of competency needed for implementing technology in the classroom. *Contemporary Educational Technology, 6*(1), 38-61.

Becker, H. J., & Ravitz, J. (1999). The influence of computer and internet use on teachers' pedagogical practices and perceptions. *Journal of Research on Computing in Education, 31*(4), 356-384.

Bell, B. S., & Federman, J. E. (2013). E-learning in postsecondary education. *Future of Children, 23*(1), 165-184.

Bouck, E. C., & Flanagan, S. (2009). Assistive technology and mathematics: What is there and where can we go in special education. *Journal of Special Education Technology, 24*(2), 17-30.

Burgerova, J., & Adamkovicova, M. (2013). On quality of education realized through technology. *Technológia Vzdelávania, 21*(4), 1-6.

Cavanaugh, C., Dawson, K., & Ritzhaupt, A. (2011). An evaluation of the conditions, processes, and consequences of laptop computing in K-12 classrooms. *J. Educational Computing Research, 45*(3), 359-378.

Chaudhary, A. G. (2008). Digital game-based learning - future of education? *Pranjana, 11*(2), 1-15.

Chen, R. (2011). Preservice mathematics teachers' ambiguous views of technology. *School Science and Mathematics, 111*(2), 56067.

Cheung, A. C. K., & Slavin, R. E. (2013). Effects of educational technology applications on reading outcomes for struggling readers: A best-evidence synthesis. *Reading Research Quarterly, 48*(3), 277-299.

Christensen, R., & Knezek, G. (2001). Instruments for assessing the impact of technology in education. *Evaluation and Assessment in Educational Information Technology*, 5-25.

Cox, M. J. (2012). Formal to informal learning with IT: Research challenges and issues for e-learning. *Journal of Computer Assisted Learning,* 1-21.

Deaney, R., Ruthven, K., & Hennessy, S. (2006). Teachers' developing 'practical theories' of the contribution of information and communication technologies to subject teaching and learning: An analysis of cases from English secondary schools. *British Educational Research Journal, 32*(3), 459-80.

del Blanco, Á., Torrente, J., Marchiori, E. J., Martinez-Ortiz, I., Moreno-Ger, P., & Fernández-Manjón, B. (2012). A framework for simplifying educator tasks related to the integration of games in the learning flow. *Educational Technology & Society, 15*(4), 305-318.

Deubel, P. (2006). Game on. *T H E Journal, 33*(6), 30-41.

Drigas, A. S., & Ioannidou, R. (2013). Special education and ICTs. *Ijet, 8*(2), 41-47.

Duhaney, L. M. G., & Duhaney, D. C. (2000). Assistive technology: Meeting the needs of learners with disabilities. *International Journal of Instructional Media, 27*(4), 393-401.

Duran, M. & Aytac, T. (2016). Students' opinions on the use of tablet computers in education. *European Journal of Contemporary Education, 15*(1), 65-75.

FAS Learning Technologies. (2006). *National summit on educational games.*

Ferdig, R. E. (2006). Assessing technologies for teaching and learning: Understanding the importance of technological pedagogical content knowledge. *British Journal of Educational Technology, 37*(5), 749-760.

Flanagan, S., Bouck, E. C., & Richardson, J. (2013). Middle school special education teachers' perceptions and use of assistive technology in literacy instruction. *Assistive Technology, 25*, 24-30.

Flumerfelt, S., & Green, G. (2013). Using lean in the flipped classroom for at risk students. *Educational Technology & Society, 16* (1), 356-366.

Fragkouli, E., & Hammond, M. (2007). Issues in developing programmes to support teachers of philology in using information and communications technologies in Greek schools: A case study. *Journal of in-Service Education, 33*(4), 463-477.

Fu, Z. (2010). On the applications of modern educational technology in translation of maritime English from the perspective of constructivism. *Journal of Language Teaching and Research, 1*(4), 412-415.

Garza Mitchell, R. L. (2011). Planning for instructional technology in the classroom. *New Directions for community colleges, 2011*(154), 45-52.

Gee, J. P. (2007). *What video games have to teach us about learning and literacy.* New York: Palgrave Macmillan.

Geri, N. (2012). The resonance factor: Probing the impact of video on student retention in distance learning. *Interdisciplinary Journal of E-Learning and Learning Objects, 8*, 1-13.

Girod, M., Martineau, J., & Zhao, Y. (2004). After-school computer clubhouses and at-risk teens. *American Secondary Education, 32*(3), 63-76.

Hancock, R., Knezek, G., & Christensen, R. (2007). Cross-validating measures of technology integration: A first step toward examining potential relationships between technology integration and student achievement. *Journal of Computing in Teacher Education, 24*(1), 15-21.

Hauser, J., & Malouf, D. B. (1996). A federal perspective on special education technology. *Journal of Learning Disabilities, 29*(5), 504-511.

Hechter, R. P., & Vermette, L. A. (2013). Technology integration in K-12 science classrooms: An analysis of barriers and implications. *Themes in Science & Technology Education, 6*(2), 73-90.

Heinecke, W. F., Milman, N. B., Washington, L. A., & Blasi, L. (2001). New directions in the evaluation of the effectiveness of educational technology. *Evaluation and Assessment in Educational Information Technology, 18*(2/3), 97-110.

Hong, J. C., Cheng, C. L., Hwang, M. Y., Lee, C. K., & Chang, H. Y. (2009). Assessing the educational values of digital games. *Journal of Computer Assisted Learning, 25*(5), 423-437.

Hsieh, Y. H., Lin, Y. C., & Hou, H. T. (2014). Exploring elementary-school students' engagement patterns in a game-based learning environment. *Educational Technology & Society, 18*(2), 336-348.

Hur, J. W., & Oh, J. (2012). Learning, engagement, and technology: Middle school students' three-year experience in pervasive technology environments in South Korea. *Journal of Educational Computing Research, 46*(3), 295-312.

Ibrahim, A. A. (2015). Evolutionary nature of the definition of educational technology. *International Journal of Social Science & Education, 5*(2), 233-239.

Jenkinson, J. (2009). Measuring the effectiveness of educational technology: What are we attempting to measure? *Electronic Journal of e-Learning, 7*(3), 273-280.

Jones, T. H., & Paolucci, R. (2000). Research framework and dimensions for evaluating the effectiveness of educational technology systems on learning outcomes. *Journal of Research on Computing in Education, 32*(1), 17-27.

Katims, D. S., & Diem, R. A. (1996). Technological interventions and student attitudes: A case study of secondary students identified as at risk. *High School Journal, 80*(2), 95.

Keller, C. J., Finkelstein, N. D., Perkins, K. K., & Polluck, S. J. (2006). Assessing the effectiveness of a computer simulation in introductory undergraduate environments. *AIP Conference Proceedings, 883*(1), 121-124.

Kemker, K., Barron, A. E., & Harmes, J. C. (2007). Laptop computers in the elementary classroom: Authentic instruction with at-risk students. *Educational Media International 44*(4), 305-321.

Kemp, S. J. (2012). The student experience of learning: A case study of technology enhanced learning. *The International Journal of Learning, 18*(6), 37-49.

Killedar, M. (2008). Effectiveness of learning process using "web technology" in the distance learning system. *Turkish Online Journal of Distance Education, 9*(4), 109-119.

Laurillard, D. (2007). Modeling benefits-oriented costs for technology enhanced learning. *Higher Education, 54*(1), 5-20-10.1007/s10734-006-9044-2.

Lee, H. J., Messom, C., & Yau, K. A. (2013). Can an electronic textbooks be part of K-12 education?: Challenges, technological solutions and open issues. *The Turkish Online Journal of Educational Technology*, *12*(1), 32-44.

Lewis, T. (1996). Studing the impact of technology on work and jobs. *Journal of Industrial Teacher Education, 33*(3), 44-65.

Lunenburg, F. C. (1998). Constructivism and technology: Instructional designs for successful education reform. *Journal of Instructional Psychology, 25*(2), 75-81.

Marino, M. T., & Beecher, C. C. (2010). Conceptualizing RTI in 21st-century secondary science classrooms: Video games' potential to provide tiered support and progress monitoring for students with learning disabilities. *Learning Disability Quarterly, 33*, 299-311.

McCombs, B. L. (2000). Assessing the role of educational technology in the teaching and learning process: A learner-centered perspective, 2-17.

Mellon, C. A. (1999). Technology and the great pendulum of education. *Journal of Research on Computing in Education, 32*(1), 28-34.

Miller, M. (2009). What the science of cognition tells us about IT. *Change: The Magazine of Higher Learning, 42*(6), 16-17.

Okolo, C.M., Rieth, H.J., & Bahr, C.M. (1989). Microcomputer implementation in secondary special education programs: A study of special educators', mildly handicapped adolescents', and administrators' perspectives. *Journal Of Special Education, 23*(1).

Overby, A., & Jones, B. L. (2015). Virtual legos: Incorporating minecraft into the art education curriculum. *Art Education, 68*(1), 21-27.

Özgüç, C. S., & Cavkaytar, A. (2014). Teacher use of IT in a special education school for students with intellectual disabilities: A case study. *Turkish Online Journal of Qualitative Inquiry, 5*(1), 51-65.

Pamuk, S., Çakir, R., Ergun, M., Yimaz, H. B., & Ayas, C. (2013). The use of tablet PC and interactive board from the perspectives of teachers and students: Evaluation of the FATIH project. *Educational Sciences: Theory & Practice, 13*(3), 1815-1822.

Parkes, M. P., Reading, C., & Stein, S. (2013). The competencies required for effective performance in a university e-learning environment. *Australasian Journal of Educational Technology*, *29*(6), 777-791.

Peterson-Karlan, G. R. (2011). Technology to support writing by students with learning and academic disabilities: Recent research trends and findings. *Assistive Technology Outcomes and Benefits, 7*(1), 39-61.

Prensky, M. (2001). *Digital game-based learning.* New York: McGraw-Hill.Spires, H. A.

Puckett, R. (2013). Educational technology and its effective use. *I-Manager's Journal of Educational Technology, 10*(3), 6-11.

Razak, A. A., & Connoly, T. M. (2013). Using games-based learning: How it influences the learning experience and outcomes of primary school children. *International Journal of Emerging Technologies in Learning, 8*(2), 47-54-10.3991/ijet.v8iS2.2782.

Reinhart, J. M., Thomas, E., & Toriskie, J. M. (2011). K-12 teachers: Technology use and the second level digital divide. *Journal of Instructional Psychology, 38*(3/4), 181-193.

Ritzhaupt, A. D., Dawson, K., & Cavanaugh, C. (2012). An investigation of factors influencing student use of technology in K-12 classrooms using path analysis. *J. Educational Computing Research, 46*(3), 229-254.

Ritzhaupt A. D., Feng L., Dawson K., & Barron A. E. (2013) Differences in student information and communication technology literacy based on socio-economic status, ethnicity, and gender: Evidence of a digital divide in Florida schools. *Journal Of Research On Technology In Education (International Society For Technology In Education), 45*(4), 291-307.

Sang, G., Valcke, M., van Braak, J., Tondeur, J., & Zhu, C. (2011). Predicting ICT integration into classroom teaching in Chinese primary schools: Exploring the complex interplay of teacher-related variables. *Journal of Computer Assisted Learning, 27*(2), 160-172.

Shaw, E. L., Jr., Giles, R. M., & Hibberts, M. (2013). Does technology make a difference? investigating the impacts of instructional method on second graders knowledge acquisition and retention of rock types. *Global Education Journal, 2013*(1), 83-92.

Simion, E., Chirvasiu, N. D. V., & Michel, T. (2014). Information and communication technologies and the equalization of opportunities. *ELearning & Software for Education*, (2), 454-459.

Silver, J., & McDonnell, J. (2007). Are movie theaters doomed? Do exhibitors see the big picture as theaters lose their competitive advantage?. *Business Horizons, 50*(6), 491-501. doi:10.1016/j.bushor.2007.07.004

Spires, H. A., Rowe, J. P., Mott, B. W., & Lester, J. C. (2011). Problem solving and game-based learning: Effects of middle grade students' hypothesis testing strategies on learning outcomes. *J. Educational Computing Research, 44*(4), 453-472.

Starr, J. (2012). A lack of depth: One preservice teacher's experiences in a post-NCLB world. *Social Studies, 103*(6), 241-246. doi:10.1080/00377996.2011.630698

Tay, L. Y. & Lim, C. P. (2010). An activity theoretical perspective towards the design of an ICT-enhanced after-school programme for academically at-risk students. *Educational Media International 47*(1), 19-37.

Tucker, S. Y. (2014). Transforming pedagogies: Integrating 21st century skills and web 2.0 technology. *Turkish Online Journal of Distance Education, 15*(1), 166-173.

VanSlyke-Briggs, K., Hogan, M., Waffle, J., & Samplaski, J. (2014-2015). School partnerships: Technology rich classrooms and the student teaching experience. *J. Educational Technology Systems, 43*(2), 121-141.

Vasquez III, E., & Straub, C. (2012). Online instruction for k-12 special education: A review of the empirical literature. *Journal of Special Education Technology, 27*(3), 31-40.

Wadmany, R., & Kliachko, S. (2014). The significance of digital pedagogy: Teachers' perceptions and the factors influencing their abilities as digital pedagogues. *I-Manager's Journal of Educational Technology, 11*(3), 22-33.

Wen, J., Chuang, M. K., & Kuo, S. (2012). The learning effectiveness of integrating e-books into elementary school science and technology classes. *International Journal of Humanities and Arts Computing, 6*(1-2), 224-235.

Winslow, J., Smith, D., & Dickerson, J. (2014). Collaborative technology integration training: Graduate students and K-12 teachers learning together. *National Teacher Education Journal, 7*(1), 45-52.

Wu, W. H., Hsiao, H. C., Wu, P. L., Lin, P. L., Lin, C. H., & Huang, S. H. (2011). Investigating the learning-theory foundations of game-based learning: A meta-analysis. *Journal of Computer Assisted Learning, 28*(3), 265-2179.

Yaman, S. (2010). Technology supported learning platform: Moodle integrated academic course. *Turkish Online Journal of Distance Education, 11*(2), 146-160.

Zhao, Y. & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal, 40*(4), 807-840.