Chapter 2

Review of Relevant Literature

21st Century Learning

Much has been heard about the need for students and educators to change their strategies and expectations for the 21st century. In this new global approach it is believed students will need to acquire a new set of skills beyond the basic knowledge of the past (Partnership for 21st Century Learning, 2011; Jaeger, 2013; Barnes & Tynan, 2007).

Wagner (2012, p. 12) has described the "Seven Survival Skills" students need for the 21st century economy. These are:

1) Critical thinking and problem solving,

2) Collaboration across networks and leading by influence,

3) Agility and adaptability,

4) Initiative and entrepreneurship,

5) Accessing and analyzing information,

6) Effective oral and written communication,

7) Curiosity and imagination.

The International Society for Technology Education (ISTE) is even more specific by creating a very clear set of standards they believe every student should acquire before graduating (ISTE, 2007). The ISTE created six categories which describes what 21st century students need to master for 21st century learning. Not all of these skills are specifically related to technology. These six categories by the ISTE are:

1) Creativity and innovation,

2) Research and information fluency,

3) Communication and collaboration,

4) Critical thinking, problem solving and decision making,

5) Digital citizenship,

6) Technology operations and concepts.

These categories overlap very closely with the survival skills posited by Wagner (2012). The Partnership for 21st Century Education (2011) has applied their own version of expectations for our global economy including technology and social skills beginning with the four critical elements:

1) Communication,

2) Collaboration,

3) Critical thinking,

4) Creativity.

Barnes & Tynan (2007) use an analogy from a fictitious student named Miranda, to give us an example of 21st century learning and the dis-connect between today's students and the instructors. Miranda is described as starting her day with the use of multiple technology tools to catch up on the world and to prepare for the day's events as she multi-tasks and communicates with people who are not necessarily geographically connected with her but who represent her global community. Information and support in reviewing and analyzing information is merely a few commands away on a mobile device. Her world is real-time all the time. If there is a digital divide, Miranda is riding at the forefront of 21st century lifestyle.

Illustrating where students are today, Prettyman, Ward, Jauk, and Awad (2012) document how students are adjusting to 21st century learning. In their example, elementary students took classes in a Math, Engineering, Science, and Technology (STEM) program, which highlights

many characteristics pursued in a 21st century education. The elementary school students were engaged in a one-to-one learning environment, where each student used their own computer. These young students used technology to become creators of knowledge. Beyond being technologically competent, these students identified themselves as being great collaborators and independent learners, which happen to be hallmarks of a 21st century education. Likewise, in a 2009 national survey of students across America, students demonstrated how far they are ahead of teachers, administrators, and other education leaders in envisioning and pursuing a 21st century education (Project Tomorrow, 2010). These students voiced their desire and personal initiative, to shape their own learning through communication and collaboration without political or geographic boundaries to create their own networks to access specialized knowledge on demand at any time.

Achievement and the Common Core

High stakes testing and the adoption of Common Core have created an impetus for change (Liebtag, 2013). Many of the schools serving minority and socio-economically deprived students have been labeled as failing (Foster, 2014; Johnson, 2011). Socioeconomically disadvantaged students have performed poorly on standardized tests. The effects of high school exit examinations are explored by various studies. Some studies revealed the implementation of high school exit exams themselves did not necessarily put students at risk (Murnane, Papay, &Willett, 2009; Ou, 2009; Reardon & Kurleander, 2009). However, the implementation of more rigorous exams is disproportionately impacting socioeconomically disadvantaged students and minorities and thus has created an environment which has negatively impacted their attitudes and ability to graduate while not increasing student achievement (Adams & Karabenick, 2000; Holme, Richards, Jimerson, & Cohen, 2010).

Nichols, Glass, and Berliner (2012) measured the impact of high stakes testing stress on minority students revealing little gains in achievement with increased testing pressure. Simultaneously, the authors found schools or districts exerted more pressure on students in lower socioeconomic groups than other groups. More needs to be done to increase the academic abilities and learning comfort of minorities to become successful with high stakes testing, such as the California High School Exit Exam (CAHSEE) (Nichols, Glass, & Berliner, 2012; Reardon & Kurlaender, 2009). Meeting their needs should be a top priority for educators as we enter into a new era of high stakes testing (Kamenetz, 2015; Liebtag, 2013; Nichols, Glass, & Berliner, 2012).

When studying the educational process one must look at learning motivations before discussing performance and learning skills as there is a correlation between the students' performance and their drive to succeed (Iordache, 2014). Educators must evaluate students' proficiency as related to their motivation, both intrinsic and extrinsic to find what drives them. The high school exit exam has already been shown to have an impact on English language learners' graduation rates as high schools adopt new strategies to help these students succeed (Aspen, 2012; Bunch, Kibler, & Pimentel, 2012; Reardon & Kurlaender, 2009). Now with the implementation of the Common Core State Standards (CCSS) students are expected to read complex informational text despite the evidence that students are already graduating from high school with an inability to read at a basic level (Bunch, Kibler, & Pimentel, 2012). Rigorous learning should look like it is rigorous; students should be pondering rather than racing through assignments though not to the level of frustration and despair (Ripley, 2013).

As with many other national issues, the implementation of the CCSS is less than equitable (Liebtag, 2013). Though the Smarter Balanced Assessment Consortium (SBAC) has

promised a test that will be fair for English language learners, the test does not yet exist and therefore there is reason for concern for its equity (Kamenetz, 2015; Liebtag, 2013). Different states and school districts are implementing the Common Core curriculum in a myriad of ways, oftentimes making few changes from the traditional curricula or they may simply be looking for the least expensive alternative as opposed to the most effective (Liebtag, 2013). Hakuta, Santos, and Fang (2013) pointed out the CCSS relies on all content areas to provide non-fiction, relevant material to all students. Therefore, much more will be expected of students when working with science texts adopted by their school or district, especially English language learners (Bunch, Kibler, & Pimentel, 2012; Hakuta, Santos, & Fang, 2013).

Learning for the 21st century and the Common Core bring the use of technology into the mainstream of education not primarily as a tool for the teacher, but as a tool to transition students to college and career readiness (Partnership for 21st Century Learning, 2011). Delen and Bulot (2011) discovered factors on how the use of technology influenced standardized achievement scores in math and science. Some of the factors which influence students' use of technology are where the students reside and where they attend school (Collins & Halverson, 2009; Delen & Bulot, 2011; Riply, 2013). The correlation between the students' academic achievement to their use of technology at home is positive (Delen & Bulot, 2011). However, there is no correlation of positive academic achievement by the student when the technology is used in the classroom or at school (Delen & Bulot, 2011; Riply, 2013). In fact, according to Riply (2013, p.214), "the anecdotal evidence suggests that Americans waste an extraordinary amount of tax money on high-tech toys for teachers and students, most of which have no proven learning value whatsoever."

Motivation and Learning Satisfaction

Prensky (2005) categorized students into three groups: 1) the much cherished self-motivated, 2) those who follow along, and 3) those who seem to be elsewhere. This third group is growing in our digital age and motivating them is our challenge. This group which is accustomed to being forever engaged with online experiences, both material and with other people, is growing (Bell, 2010; Prensky, 2005; Round, 2011; Zafirov, 2013).

This group of students, who seem to be elsewhere, and may be going nowhere, is lamented by teachers for their lack of perceived motivation and the implied correlation to low achievement (Bennett, 2015; Dwyer, 2012; McShane, 1997; Trout, 2010). The relationships between motivation, achievement, and learner satisfaction are complex with the various determinants of intrinsic and extrinsic motivation, such as classroom environment, method of instruction, and learning styles (Althoff, 2007; Asiyai, 2014; Pink, 2009; Wu, Hsiao, Wu, Lin, & Huang, 2010).

Meyer and Turner (2006) found emotional environment can be one of those factors determining classroom motivation. Students with negative self-perceptions or negative perceptions about school are less likely to feel motivated. The negative perception, of course, extends to the teacher as well. When students have an environment where their positive experiences are regularly reinforced they are more likely to have views of their classroom interactions in a positive light thereby creating a basis for motivation to learn (Bell, 2010; Covili, 2012; Meyer & Turner, 2006; Pink, 2009; Wagner, 2012). Loukomies (2013) explored motivation towards science learning and the relationship to personal needs to see what factors influence students to pursue or not pursue a science related field. By designing lessons that meets the students' various personal needs, students are more likely to be intrinsically motivated,

thus will ultimately perform better academically (Loukomies, 2013; Prensky, 2010). When students' personal psychological needs are met they showed greater motivation, particularly when the activities are found to be meaningful to them (Loukomies, 2013).

Lawrence and Vimala (2013) did a similar study looking at students' self-concepts and achievement motivation with high school students. As might be anticipated, a positive correlation was found between students' self-concept and achievement. Interestingly, rural students scored lower in self-concept than either urban or sub-urban students. Wu, Hsiao, Wu, Lin, and Huang (2010) conducted a survey and discovered when motivation is high, the academic achievement of students of different learning styles increased.

Smart and Cappel (2006), noticed a significant increase in learner satisfaction is correlated with the amount of prior experience the students had with using technology. This supports Rovai, Ponton, Wighting, and Baker (2007) study where they discovered students in an e-learning group showed more intrinsic motivation and learner satisfaction than students in a traditional classroom. As learning with technology becomes more common, evaluating how best to use the technology for the desired outcomes becomes more important (Collins & Halverson, 2009; Covilli, 2012; Smart & Cappel 2006).

Culture influences students' experiences in learning and their education (Ripley, 2013). Different cultures are satisfied with the e-learning experience for different reasons (Chang, 2012; Rovai et al., 2007). In Chang's study the Chinese students noted working together collaboratively as the greatest source of satisfaction yet they spent far less time than the Finnish students working collaboratively (Chang, 2012). While the Finnish students themselves regarded the self-paced nature of the e-learning as a plus, they disliked the amount of time the collaboration component required.

Blumenfeld, Soloway, Marx, Krajcik, Guzdial, and Palincsar (1991) explained how collaborative project based learning, aided by technology, has an impact on learner motivation. Based on their study, long term projects require the students to gather, discuss, and synthesize real world data with the aid of technology. This type of lengthy and in-depth project and the fact it involved the use of technology has a positive impact on student motivation when designed well (Blumenfeld et al., 1991; Godzicki, Krofel, & Michaels, 2013; Hsiao et al., 2010; Zafirov, 2013). Teachers will have to carefully design, or redesign, projects to take advantage of new technology or existing technology being used in new ways (Bell, 2010; Blumenfeld et al., 1991; Papanidolaou & Boubouka, 2010; Zafirov, 2013).

Historic Overview of the Impact of Technology on Education

For hundreds of years, changes in technology have impacted how a society shapes its education policy. Collins and Halverson (2009) found each era of American schooling is galvanized by a disruptive technology to the world. For example, the invention of the printing press spurred on the need for literacy amongst the people. The Massachusetts Act of 1647 forced the traditional apprenticeship form of education into a universal schooling system. This act also led to a creation of a system for mainstream education upon the hiring of the schoolmaster.

Another milestone in history was during the American Revolution when Thomas Jefferson proposed an educated populace was needed if America was to remain a free democratic republic of the people, one which could create its own public policy and not be ruled over by a king (Collins & Halverson, 2009). The Industrial Revolution helped to shape the vision of Horace Mann and his pioneer reforms of education in Boston, Massachusetts. In the 1960's the Science, Technology, and Society Movement (STS) recognized the importance of technology,

science, and society as a major influence in education. However, at the time they emphasized science more than technology or society (Cheek, 1997).

Now in the 21st century, society has reached the period of the Information Revolution (Covili, 2012; Collins & Halverson, 2009; Luterbach & Brown, 2011). Information Revolution revolves around user customization, interaction with other users, and user-control (Collins & Halverson, 2009; Johnson, Levine, Smith, & Haywood, 2010; Liu, Kou, Shih, Meng & Lee, 2010; Luterbach & Brown, 2011; Round, 2011). The Information Revolution has changed the way we produce, consume, communicate, think, and learn (Chang & Guetl, 2010; Collins & Halverson, 2009; Covili; 2012; Johnson et al., 2010; Luterbach & Brown, 2011; Round, 2011). "If we look carefully, most of these changes in the way people acquire information are occurring outside of schools" (Collins & Halverson, 2009, p. 5). This statement correlates well with the study done by Delen and Bulot (2011), where they correlated technology use in the home with higher student academic achievement.

One of the biggest game changers in technology for education is Google Apps for Education (Covili, 2012; Dessoff, 2010; Miller, 2013, Mollica, 2014). Before Google, it took more time to access and use essential technology (Dessoff, 2010; Mollica, 2014). The extra time to access needed content created a dis-connect between students and teachers and it reduced student engagement and happiness (Mollica, 2014). In fact, Mollica believes life before and after Google Apps could almost be compared to what life was like before and after electricity. After Google Apps, it was as if someone flipped a switch and automated the educational world. In addition, given the current economic downturn Google Apps has been an economic lifesaver with its free service (Dessoff, 2010; Mollica, 2014; Reimche, 2013; Sulton,

2010). In summary, historic milestones and disruptive innovations have become the driving forces behind change in public education.

Access to Technology

Collaborating with others has become the norm in a business world (Covili, 2012). It is important for classrooms to simulate this experience. Yet many classrooms still have student desks lined up in neat little rows where students sit next to each other and work on their tasks independently. Having access to Google tools has broken down these constraints and has allowed students to collaborate on projects at any time, with anyone, in any place (Covili, 2012; Dessoff, 2010; Miller, 2013, Mollica, 2014). In addition, online collaboration does not require a one-on-one computer for each student (Vogel, 2009). It is important to note when implementing Common Core and 21st century learning that not all schools will have an equal start in adapting to the technology use for students (Hakuta, Santos, & Fang, 2013). Some schools will continue to utilize the traditional texts while others will make use of technology in the most cost effective way possible. However, it is still important for classrooms to be updated and have some level of access to 21st century technology so students can develop the necessary skills and stay competitive on a global scale (Covili, 2012).

Creating a 21st-Century Learner

When Vogul (2009) interviewed an instructional technology specialist in New York, he found learning has become a very "social thing" in the 21st century. In New York they are trying to undo the mentality of just doing your own work, sitting in your own seat, and not talking to your neighbor. Schools need to adapt to the current 21st century learner's needs and realize that 21st century students are very different from previous generations due to the pace of information technology development (Johnson et al., 2010; Liu et al., 2010). Many education

professionals feel a shift to a more learner-centered model which focuses on student potential is more important than the traditional body of knowledge model. These professionals also maintain a learner-centered model will help to better sustain the learning process (Johnson et al., 2010).

In the 21st century, digital technology is empowering students with easy access to communication and socialization thus allowing the learner to take control of one's own learning (Azlina, 2010; Johnson et al., 2010; Patter, 2009; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). Cotugno (2014) warns if schools continue to use outdated technology in the classrooms it will not prepare students for the demands of 21st century life. Using Google Drive in the classroom provides an immediate connection between the classroom and students' everyday lives because Google can be used anywhere (Cotugno, 2014).

Dangers of Technology in a 21st Century Education

It is easy to recognize technology in the classroom, whether there is a computer, a SMART Board, or a chalkboard (Contugo, 2014). It is essential teachers and students understand technology is not a means for delivering content, but as both a tool and a subject of intellectual inquiry.

Google Apps for education may seem like a success story for education, but there are detractors who see Google as a monopoly with the power and incentive to stifle competition (Hatch, 2011; Pike, 2011). Google has been in the news with charges of violation of privacy and data mining (Hatch, 2011; Herold, 2014; Pike, 2011). One of the most recent charges is collecting data from student emails in Google Apps for Education (Herold, 2014). Google has even been accused of manipulating search results by giving prominence to its AdWords customers (Pike, 2011). In addition, teachers have limited understanding of the various tools included in Google Drive (Covili, 2012).

The digital world has created a global playground for content providers and publishers (Brynko, 2011). Education is essential to creating a form of universal access while protecting copyright laws. Agencies such as Copyright Clearance Center (CCC) are working to create a bridge between the publishers and users. Google even included one of the CCC videos to put on Google's copyright page.

All technology must ultimately, or at least in good faith, be accessible to all students in some way regardless of the student's needs (Almond, Winter, Cameto, Russell, Sato, Clarke-Midura, & Lazarus, 2010; Herold, 2014). Google Docs lacks the usability features that are included in some other document software suites which make working with documents easier for students who have visual, auditory, or motor impairments (Almond et al., 2010). The lack of such features could inhibit a student's ability to achieve and become a potential liability for the teacher.

Importance of Collaboration in the Classroom

When Vogel (2009) interviewed the president of a national think tank he found collaboration and communication are key elements for the new model of learning. In addition, his think tank also interviewed 500 human resource managers and collaboration always appeared at the top for essential skills to succeed in a company. The International Society for Technology in Education (ISTE) has also placed collaboration as the second most important item on their list of national educational technology standards (Vogel, 2009; ISTE, 2007). Luterbach and Brown (2011) performed a Delphi Study on the essential educational skills for the 21st century student. They concluded being literate, possessing Information and Communication Technology (ICT) skills, and having social skills to communicate and collaborate are needed for the 21st century student (Luterback & Brown, 2011).

When Vogul (2009) interviewed an instructional technology specialist in Florida, he discovered Florida is using collaboration as a framework to incorporate technology into teaching via a constructivist model - the more the students construct and produce during the learning process the more they learn from it. He noticed the benefits of collaboration and how it puts students in a position where they succeed and that breeds more success. John Dewey (1938) supported the constructivist model of "learning by doing" as well.

To get the most from a collaborative classroom, teachers need to do more than pair up students into teams or have students share computer equipment: it is about teaching the kids how to collaborate (Blumenfeld et al., 1991; Papanikolaou & Boubouka, 2010; Vogel, 2009; Zafirov, 2013). In a good collaborative environment the students know what their role is for the project and what skills they can bring to the project, such as research skills, leadership skills, management skills, and public speaking skills (Vogel, 2009). Teachers often discover they get more from a collaborative unit when they keep the team sizes less than six and let the students organize the tasks and choose their team leaders (Vogel, 2009; Zafirov, 2013). Teachers should also strive to create an environment in which students are comfortable sharing their ideas within their own groups and with members of other groups (Covili, 2012; Meyer & Turner, 2006). After all, collaboration involves much more than simply working together on a project with other students. Collaborative activities require students and teachers to both actively be engaged with one another, to learn from one another, and to rely on one another as an integral part of the students' education (Covili, 2012; Johnson et al., 2010; Zafirov, 2013).

In a collaborative e-learning classroom study done by Papanikolaou and Boubouka (2010), students exhibited the type of growth in critical thinking Covili (2012) discussed when students collaborated in groups at specific stages of the learning cycle in an asynchronous

discussion forum. The instructors evaluated the discussions of each group on their understanding

of the project-definition, assessment criteria, and overall development of the group product.

Although the type of communication, and the amount of time each group spent communicating

differed, the overall discussion of the final product grew larger in scale than anticipated.   This

study showed that the value of project-based e-learning with collaborative features promotes

enhanced metacognitive knowledge (Blumenfeld et al., 1991; Papanikolaou & Boubouka, 2010;

Zafirov, 2013).

Using Technology as a form of Collaboration

In the Digital World tools such as social networks, wikis, blogs, voicestream, YouTube,

and Google Docs allow users to become participants and collaborators in their chosen online

community (Sultan, 2010; Vogel, 2009).   Teachers are also excited about Microsoft's Live@edu

which comes with its own set of collaborative tools to help facilitate students' interactivity with

teachers and other students (Dessoff, 2010).

Essentially, cloud computing has transformed the way we compute and communicate,

store and access data, and how students can conduct collaborative work (Johnson et al., 2010;

Round, 2011). Having access to a virtual collaborative environment, via the cloud or some other

technological tool, gives students tremendous opportunities to interact with peers and mentors

(Johnson et al., 2010; Reimche, 2013; Zafirov, 2013).

Students can also experience other world views and model the kinds of work patterns

taking place in an increasing number of professions. Technology has changed the way learning

spaces are perceived and traditional physical spaces are being replaced with virtual

communication and collaboration (Covili, 2012; Johnson et al., 2010; Liu et al., 2010).

Lastly, technology is not simply limited to a desktop or laptop computer, cell phones, tablets are also forms of digital communication devices that can be used for communication, collaboration, sharing, solving problems, and making informed decisions (NGSS Lead States, 2013; Round, 2011; Vojtek, 2015). Some tech-smart schools offer Bring Your Own Devices (BYOD) as another form of technology for students to use to collaborate and communicate with each other (Vojtek, 2015).

Google and Collaboration

Cotugno (2014) states "Google Drive helps me help my students" (p. 66). Google Apps for Education is one of those tools considered a game changer in the field of education (Covili, 2012; Dessoff, 2010; Miller, 2013, Mollica, 2014). For example, students at Van Meter Elementary School made connections between Google Drive and their Edmodo assignments (Miller, 2013). In addition, they were very excited about the collaborative piece of Google. Students who used Google Drive believed it would be motivating and helpful to create and collaborate with their classmates. The file sharing ability to share their work with their teachers and parents made it even more enticing and engaging (Miller, 2013; Mollica, 2014). For Clarkstown New York Central School District, Google Apps for Education has become a cornerstone for practically everything they do because of the flexibility it provides (Dessoff, 2010). Clarkstown's main objective was to create both a collaborative and accessible curriculum planning system to empower teachers and students with 21st century resources.

Cotugno (2014) prefers Google Drive for her college students because it ensures the technology they use in the university can be accessed once they graduate. Thus they can take their learning of communication and collaboration to their workplace. On the flip side, when college students purchase software packages from their student stores, the licenses often times

specify it is for educational purposes only, such as Microsoft Office for example. Thus it becomes illegal for students to use educational versions of their software at their future workplaces. Hence Cotugno prefers Google Drive and other cloud-based apps for learning at the college level.

Online Collaboration to help with Student Motivation

Limm, Morris, and Kupritz (2007) compared online versus blended learning, to evaluate both the instructional outcomes and the satisfaction of the students. As opposed to comparing a traditional face-to-face classroom to some sort of an e-learning environment, this study sought to compare two different e-learning strategies to measure both outcomes and learner satisfaction. Collaboration was discovered to be an important factor in learner satisfaction (Bell, 2010; Godzicki et al., 2013; Limm, Morris, & Kupritz, 2007; Papanikolaou & Boubouka, 2010; Zarirov, 2013). However, online-only learners indicated feelings of having less support and having to expend more time than the blended learning students (Limm, Morris, & Kupritz, 2007). In addition, students who exhibited extrinsic motivation did not fare as well as the students who exhibited stronger intrinsic motivation characteristics (Delialioglu, 2005). The extrinsically motivated students demonstrated more dissatisfaction and frustration with the course whereas the intrinsically motivated students seemed to have a clearer understanding and a higher sense of self-efficacy (Delialioglu, 2005; Mason and Weller, 2000; Rovai et al., 2007). Collaboration and interaction to produce a product with peers are a major component of 21st century learning and the Common Core (Partnership for 21st Century Skills, 2011).

Helping to fill in the profile of the e-learning experience for the student is Gilbert, Morton, and Rowley (2007). Their study reveals the students valued the interaction with other students via a discussion board; but, not all the students felt comfortable with the discussion

boards or they were uncomfortable with the use of the boards. These same students expressed concerns over the assistance they received from the tutors in the program which left them feeling a lack of support for their learning needs. This suggests these are important points to consider when designing a program with high learner satisfaction (Bell, 2010; Gilbert, Morton, & Rowley, 2007; Godzicki et al., 2013; Johnson et al., 2010; Round, 2011).

Surveys are a useful tool to gauge student motivation (Busch & Turner, 1993; Köksal, Ertekin, & Çolakoğlu, 2014; Rotgans, 2010) particularly when based on a numerical scale which allows students to provide a range of responses as opposed to a simple yes or no. Rotgans (2010) created a questionnaire that proved to be a good predictor at correlating the students' overall motivation with final grades. Once again, the characteristics measured for intrinsic motivation proved to be more of a significant predictor of the students' success than the measurements for extrinsic motivation (Fliegelman, 2011; Pink, 2009; Rotgans, 2010).

Online Collaboration to help with Student Engagement

The share button is like magic in Google Drive where the ability to share documents with individuals, groups, and the public make feedback, comments, and assessment timely, easy, and effective (Cotugno, 2014; Mollica, 2014). In fact, Covili (2012) and Millica (2014) found the ability to collaboratively share documents so easily leads to an increase in student and teacher happiness which helps to foster a better and more positive relationship between the instructor and the student. The ability to share and receive feedback on Google Drive increases engagement and the educational project becomes more successful. By having this online collaborative feature, the students gain knowledge while the instructors observe, encourage, facilitate, and essentially cheer them on (Covili, 2012; Millica, 2014, Suwantarathip & Wichadee, 2014). Using Google Drive, learning in a collaborative setting becomes a social interaction between

learners and teachers (Suwantarathip & Wichadee, 2014). It is this social interaction that helps to build independence and promotes active learning, especially when it comes to collaboration on writing assignments in Google Docs.

If the online collaboration is in a Project-Based Learning (PBL) format, it will help engage students in the central concepts and principles of a subject (Bell, 2010; Godzicki et al., 2013; Zafirov, 2013). This may lead students to provocative issues or questions which draws them into more in-depth exploration of more authentic and important topics. An authentic use of technology would create highly engaged students because it taps into their fluency with computers (Bell, 2010; Godzicki et al., 2013). Again the key to a PBL lesson including technology is an authentic use of technology: for example, using the Internet to conduct research where the students have to decipher between reliable and unreliable sources (Bell, 2010). Thus the students are using technology as a means, not an end to the PBL learning experience.

Technology for Project-Based Learning

"Collaborative projects were once seen as somewhat of a novelty, but now are essential for working in the Internet age" (Covili, 2012, p. 3). Project based learning is a constructivist model allowing students to actively build and manage their own learning, thus resulting in authentic student products (Zafirov, 2013). Based on the results from an online PBL case study done by Liu, Lou, Meng, and Lee (2010) in a Taiwan University group study, they concluded online PBL experiences enhanced students' knowledge in information technology as well as their hands-on skills. The online medium allowed the students to research online and create their own websites. This allowed the team members the opportunity to interact frequently and share knowledge, thus maximizing the learning experiences. The students also showed an increase in their research, decision making, implementation, and evaluation skills. The final conclusion

from the case study was the students developed a sense of independence and became active learners when they researched and planned for their project (Liu et al., 2010). Delivering a PBL lesson to the students mandates the use of essential tools and skills, including technology, for learning, self-management, and project management (Godzicki et al., 2013; Zafirov, 2013).

In a genuine PBL, Bell (2010) mentioned that student choice is a key element to creating independent thinkers and learners. When including technology in PBL, it is important to note technology is a means and not an end. It is also important to set exploration parameters to ensure students are using the Internet safely (Bell, 2010). When technology is used in an authentic PBL lesson correctly, it can promote serious creativity and out-of-the-box thinking (Bell, 2010; Blumenfeld et al., 1991; Godzicki et al., 2013; Prensky, 2010; Wagner, 2012). After all, PBL is rooted in the idea that a problem or question drives learning activities toward the construction of a concrete and authentic product (Bell, 2010; Blumenfeld et al., 1991; Godzicki et al., 2013; Papanikolaou & Boubouka, 2010). When teachers deliver an authentic PBL lesson, the students have the opportunity to pursue solutions to open-ended problems by formulating questions for investigation, constructing explanations and models, and creating products of their own understanding (Bell, 2010; Blumenfeld et al., 1991).

Chapter Summary

As we progress into our second decade of the 21st century, more and more voices clamor for changes in how we teach. A major emphasis has been placed on the use of technology for students to collaborate, communicate, create, and think critically (Covili, 2012). Several groups have specific recommendations regarding the technology skills and other 21st century skills students should acquire before graduation. However, many challenges exist and progress is slow. Socioeconomically disadvantaged students continue to trail other students in achievement and

issues of equitable access to technology exist. Many factors may impact student motivation including learning styles, environment, and socioeconomic status. Each factor requires the awareness and adjustments by the teacher to help these students achieve success. The full implementation of the Common Core is creating a new perspective on student learning which both reflects 21st century learning and goes beyond (Aspen, 2012; Liebtag, 2013). These new standards jeopardize the gains made and challenges teachers to find new ways to help students become motivated through the use of technology and collaborative project based learning. Numerous studies have compared the benefits of online learning versus traditional learning as well as the hybrid choice of blended learning (Hsiao et al., 2010; Rovai, 2007; Smart & Cappel, 2006). Google Drive provides a low cost alternative to other programs to allow socioeconomically disadvantaged schools and their students to engage in collaborative online learning (Dessoff, 2010; Mollica, 2014; Reimche, 2013; Sulton, 2010).